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THE

PHARMACOPŒIA

OF THE

UNITED STATES OF AMERICA

EIGHTH DECENNIAL REVISION

BY AUTHORITY OF THE
UNITED STATES PHARMACOPŒIAL CONVENTION
HELD AT WASHINGTON, A.D. 1900

STANFORD LIBRARY

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OF THE
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NOTE

SINCE the publication of the Pharmacopœia of the United States of America, Eighth Revision, in 1905, the Food and Drugs Act has been passed by the Congress of the United States, June 30, 1906. Section 7 of this law makes the United States Pharmacopœia, official at the time of the investigation, the standard, as determined by its tests, for the strength, quality and purity of drugs. For the first time in the history of this country the United States Pharmacopœia is thus fully recognized by the National Government as a standard. Since its first issue in 1905, the Committee of Revision has, after due consideration, decided to make some additions and corrections to the United States Pharmacopœia, Eighth Revision, and these have been incorporated in the text and tables of this volume, June 1, 1907, in their proper places, and are inserted by order of the Board of Trustees of the United States Pharmacopœial Convention.

JUNE 1, 1907.

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HISTORICAL INTRODUCTION

IN January, 1817, Dr. Lyman Spalding,* of New York City, submitted to the Medical Society of the County of New York a project for the formation of a National Pharmacopœia.†

Dr. Spalding's plan was as follows: The United States were to be divided into four districts—Northern, Middle, Southern, and Western; the New England States to form the Northern District; New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia, the Middle District; and the States south and west of these borders to constitute the other two districts.

The plan provided that a Convention should be called in each of these districts, to be composed of delegates from all the medical societies and schools situated within each of them. Each District Convention was to form a Pharmacopœia, and appoint delegates to a General Convention, to be held in Washington. To this General Convention the four District Pharmacopœias should be taken, and from the material thus brought together a National Pharmacopœia should be compiled. Dr. Spalding's plan was approved by the committee to which it was referred, and subsequently, through the agency of the Medical Society of the State of New York, it was carried into effect. This society issued circulars requesting the co-operation of the several incorporated State Medical Societies, the several incorporated Colleges of Physicians and Surgeons, or Medical Schools, or such medical bodies as constituted a faculty in any incorporated university or college in the United States; and in any State or Territory in which there was no incorporated medical society, college, or school, voluntary associations of physicians and surgeons were invited to assist in the undertaking.

---

* Born at Cornish, N.H., June 5, 1775; died at Portsmouth, N.H., October 30, 1821.

† While European pharmacopœias were chiefly relied upon as authorities previous to the appearance of the first official Pharmacopœia of the United States of America, yet a few works had appeared, previous to this time, which deserve to be recorded here.

In 1778 there was published at Philadelphia a small Pharmacopœia for the use of the Military Hospital of the U.S. Army located at Lititz, Lancaster Co., Pennsylvania, under the title: "Pharmacopœia simpliciorum et efficaciorum, in usum nosocomii militaris, ad exercitum fœderatarum *Americæ* civitatum pertinentis; hodiernæ nostræ inopiæ rerumque angustiis, feroci hostium sævitiæ, belloque crudeli ex inopinato patriæ nostræ illato debitis, maxime accommodata." A second edition of this appeared in 1781, on the title-page of which Dr. William Brown is mentioned as author.

On October 3, 1805, the Counsellors of the Massachusetts Medical Society appointed a Committee to draft a Pharmacopœia adapted to the special wants of their section of this country. The Committee, consisting of Dr. James Jackson and Dr. John C. Warren, endeavored to secure the co-operation of medical institutions in other States, with the object of making the work national, but without success. They presented the result of their labors to the Counsellors on June 5, 1807, and the work was issued some time in the early part of 1808. It was based upon the last preceding edition of the Edinburgh Pharmacopœia, but contained much original matter, among which was a posological and prosodial table.

In 1815 the Physicians and Surgeons of the New York Hospital appointed Dr. Samuel L. Mitchill and Dr. Valentine Seaman a Committee to prepare a Pharmacopœia for the use of that institution. This was issued in 1816, and enjoyed for some years an authority of more than local character.

The following organizations approved the plan of forming a National Pharmacopœia, and appointed delegates to district conventions: Massachusetts Medical Society, June 2, 1818; College of Physicians and Surgeons in the City of New York, June 25, 1818; Medical and Chirurgical Faculty of Maryland, June, 1818; Rhode Island Medical Society, September 1, 1818; Medical Society of South Carolina, September, 1818; Medical Society of the District of Columbia, October 5, 1818; Connecticut Medical Society, October 15, 1818; Medical Institution of Yale College, October 28, 1818; Vermont Medical Society, October, 1818; Board of Physicians and Surgeons of the First Medical District of the State of Indiana, November 3, 1818; College of Physicians and Surgeons of the Western District of the State of New York, January, 1819; College of Physicians of Philadelphia, February 2, 1819; Medical Faculty of Brown University, March 15, 1819; Medical School at Lexington, Kentucky, April, 1819; New Hampshire Medical Society, May 5, 1819; Medical Society of New Jersey, May 11, 1819; Medical Society of the State of Delaware, May, 1819; Medical Society of Georgia, May, 1819.

The Medical College of Ohio and the Medical Society of New Orleans approved the formation of a National Pharmacopœia, but they did not appoint delegates.

The District Convention for the New England States was held in Boston, June 1, 1819, and a District Pharmacopœia was adopted.

The District Convention of the Middle States was held in Philadelphia, June 1, 1819, and two outlines of Pharmacopœias, submitted by the delegates from New York and Philadelphia, were, by a committee there chosen, formed into one, which was adopted as the Pharmacopœia Middle District.

There were no conventions held in the Southern and Western Districts, but measures were taken, by those concerned, to secure a representation of the Southern District in the General Convention at Washington. The General Convention for the formation of a National Pharmacopœia assembled in the Capitol, at Washington, January 1, 1820, and elected Samuel L. Mitchill, M.D., President, and Thomas T. Hewson, M.D., Secretary.

The two Pharmacopœias prepared in the Northern and Middle Districts were submitted to examination, compared in detail, and their contents, with such additions as were thought necessary, consolidated into one work, which, after full revision, was adopted by the General Convention, and ordered to be published by a committee appointed for that purpose, of which Dr. Lyman Spalding was chairman. It was published in Boston, December 15, 1820, in both the Latin and English languages, a second edition appearing in 1828.

Before adjourning, the General Convention of 1820 made arrangements for the future revision of the work. It instructed its President to issue, on January 1, 1828, writs of election to the several incorporated State Medical Societies and incorporated Medical Colleges and Schools in the Northern District, requiring them to ballot for three delegates to a General Convention to be held at Washington on January 1, 1830, for the purpose of revising the American Pharmacopœia ; and that these several institutions be requested to forward to the President, on or before April 1, 1829, the names of three persons thus designated by ballot ; and the President of the Convention was requested, on the said day, to assort and count the said votes, and to notify the three persons, who should have the greatest number of votes, of their election ; and, in case there should not be three persons who had a greater number of votes than others, then the said President was desired to put a ballot into the box for each of those persons who had an equal number of votes, and draw therefrom such number of ballots as should make the number of delegates three, and notify as before directed.

This resolution was to apply in like manner to the Middle, Southern, and Western Districts.

Accordingly, there were to be three delegates from each of the four districts, the Convention thus to consist of twelve delegates.

Notwithstanding the care thus exercised by the Convention of 1820 to arrange for a Convention in 1830, a serious misunderstanding occurred, the result of which was that two Pharmacopœias were published in 1830—one in New York and one in Philadelphia.

The President issued, on January 1, 1828, writs of election, as instructed by the Convention of 1820 ; but, on account of a certain ambiguity of expression in the resolution of the Convention of 1820, and perhaps, also, in the communication of President Mitchill addressed to the various societies and colleges, some of the organizations did not correctly understand what was expected of them, and instead of sending to President Mitchill the state of the ballot, sent to him merely its result. It appears to have been the impression in many places that the societies addressed were to choose delegates, and that the delegates thus chosen were to proceed to Washington.

President Mitchill received returns from the Northern and Middle Districts, but none from the Southern and Western Districts. He counted the ballots returned to him, as he understood that they should be counted, and notified the three chosen by each of the two districts of their election, but the appointment of the delegates for the Middle District was not satisfactory to many of the medical societies of that region.

The delegates from the Northern and Middle Districts who had been notified by President Mitchill of their election, resolved, by general concurrence, and for the sake of convenience, to hold the meeting of the Convention at New York instead of Washington, as directed by the authority under which they were chosen. Eli Ives, M.D., of Yale College, Connecticut, was elected President. As they were so few in number, they adjourned for six months in order to obtain assistance from the medical fraternity of the country. They issued a circular to each of the Medical Societies and Medical Institutions in the United States not represented in the Convention, requesting each to appoint a delegate to co-operate with this Convention in revising the American Pharmacopœia; and, provided no delegate should be appointed, or, if appointed, be unable to attend, said society or medical institution or delegates were requested to communicate their ideas, in relation to the revision of the Pharmacopœia, to the Convention at their next session to be held on the first Wednesday of June, 1830, at the College of Physicians and Surgeons of New York.

The Convention met, according to agreement, in New York, June 2, 1830, ten delegates being present, representing: Connecticut, South Carolina, New York, Ohio, and Western Massachusetts. They revised the Pharmacopœia of 1820, authorized the publication of their revision, and, before adjourning, provided for a subsequent revision in 1835. The book was published in New York, November, 1830.

In consequence of the dissatisfaction existing in the Middle District, arrangements were made to hold a Convention at Washington, January, 1830, [illegible]l be more fairly representative of the medical societies, [illegible]ls of the Middle District.

The Convention was held in the Capitol, at Washington, January 4, 1830. It consisted of eight delegates, two from New Jersey, two from Philadelphia, one from Delaware, one from Maryland, and two from the District of Columbia, all members from the Middle District. Lewis Condict, M.D., of New Jersey, was elected President.

Since many sections of the United States were not represented at this Convention, and it appeared desirable that the various medical interests of the country should have their due representation, it was resolved, soon after the organization of the Convention, that the Surgeon-General of the Army, the senior surgeon of the Navy, stationed at Washington, and those Members of Congress who were practitioners of medicine, should be invited to participate in the proceedings.

In compliance with this invitation, the Surgeon-General of the Army, the senior surgeon of the Navy, and three Members of Congress took their seats in the Convention, thus increasing the number of the delegates to thirteen. The Convention appointed a Committee of Revision, consisting of a Chairman and two members from each of the following cities, viz.: Boston, New York, Philadelphia, Baltimore, Washington, Charleston, Lexington, and Cincinnati.

The Chairman of the Committee was requested to open a correspondence with the several members for the purpose of submitting to their examination a revised draft of the Pharmacopœia presented to the Convention by the delegates from Pennsylvania. He was also instructed to call a meeting of the Committee in Philadelphia. Any three members were constituted a quorum for the transaction of business, and, after a careful examination of the several communications that might be submitted to them, they were to prepare a revised edition of the Pharmacopœia, and make the necessary arrangements for its publication.

The Committee performed the duty imposed upon them, and their revision of the Pharmacopœia was published in Philadelphia in 1831.

Previous to adjournment, the Convention arranged for a Convention in 1840, by the following resolution: "*Resolved*, That the President of this Convention shall, on the first day of January, 1839, issue a notice, requesting the different incorporated State Medical Societies, the incorporated Medical Colleges, and the incorporated Colleges of Physicians and Surgeons, throughout the United States, each to elect a number of delegates, not exceeding three, to attend a General Convention to be held at Washington, D.C., on the first Monday in January, 1840."

The plan of the New York Convention for a revision of the Pharmacopœia in 1835 was abandoned. The plan of the Washington Convention for a revision in 1840 was generally recognized as the more feasible, and was fully carried out.

The notices for the choice of delegates to the Convention of 1840 were issued by Lewis Condict, M.D., President of the Washington Convention of 1830, in accordance with the resolution quoted above. The Convention assembled at Washington on the first day of January, 1840, twenty delegates being present, representing the Rhode Island Medical Society, the New Jersey Medical Society, the College of Physicians of Philadelphia, the University of Pennsylvania, the Jefferson Medical College of Philadelphia, the Delaware Medical Society, the Washington University of Baltimore, the Medical and Chirurgical Faculty of Maryland, the Medical Society of the District of Columbia, the Columbian Medical College, the Vincennes Medical Society of Indiana, and the Medical Society of Georgia.

The credentials of delegates from the Medical Society of Vermont, the Medical Society of New Hampshire, the Albany Medical College, and the College of Physicians and Surgeons of Lexington, Kentucky, were presented, but the delegates did not make their appearance during the session. Lewis Condict, M.D., of New Jersey, was elected President.

With the view of giving the various medical interests of the country proper representation in the Convention, the Surgeon-General of the Army and the senior surgeon of the Navy stationed at Washington were invited to participate in the proceedings. The Convention appointed a Committee of Revision and Publication, consisting of seven members (three to form a quorum), and the meetings of the Committee to be held at Philadelphia. To this Committee were referred all communications received by the Convention from the various organizations represented. The Committee was authorized to request the co-operation of the colleges of pharmacy in the United States, and to publish the work after the completion of the revision. Valuable assistance was rendered the Committee by the Colleges of Pharmacy of Boston and New York; the Philadelphia College of Pharmacy presented a complete revised copy of the Pharmacopœia, elaborated with ability and great industry; the Committee accepted, after deliberate examination, nearly all of the suggestions, and this caused delay in the issue of the work. The book was not published until early in the year 1842. In this revision the Latin version was omitted. The process of displacement or percolation was introduced for the first time.

Before adjourning, provision was made, by the following resolution, for a Convention in 1850:

"The President of this Convention shall, on the first day of May, 1849, issue a notice, requesting the several incorporated State Medical Societies, the incorporated Medical Colleges, the incorporated Colleges of Physicians and Surgeons, and the incorporated Colleges of Pharmacy, throughout the United States, each to elect a number of delegates, not exceeding three, to attend a General Convention to be held at Washington, on the first Monday in May, 1850."

In accordance with this resolution, the Convention met at Washington, May 6, 1850, thirty delegates being present, representing: the Rhode Island Medical Society, the Geneva Medical College, the College of Pharmacy of the City of New York, the Medical Society of New Jersey, the College of Physicians of Philadelphia, the University of Pennsylvania, the Jefferson Medical College of Philadelphia, the Medical Faculty of the Pennsylvania College, the Medico-Chirurgical College of Philadelphia, the Philadelphia College of Pharmacy, the Medical Society of Delaware, the Medical and Chirurgical Faculty of Maryland, the Medical Society of the District of Columbia, the National Medical College of the District of Columbia, the Medical Department of the National Institute, the Georgetown Medical College, and the Rush Medical College of Chicago.

The credentials of delegates from the New Hampshire Medical Institution, the University of Buffalo, the Medical Department of Hampden-Sidney College, the Medical Society of South Carolina, the Medical College of Ohio, the Cincinnati College of Pharmacy, the Missouri Medical Society, the Wisconsin State Medical Society, and the Medical Faculty of the University of Iowa were presented, but the delegates did not make their appearance during the session.

George B. Wood, M.D., of Philadelphia, was chosen President. The Surgeon-General of the Army and the Chief of the Bureau of Medicine and Surgery of the Navy Department were invited to participate in the proceedings.

The Convention appointed a Committee of Revision and Publication, consisting of the President of the Convention and three other members, three to form a quorum; the meetings of the Committee were held in Philadelphia, and the Committee published the revised work in 1851.

A second edition was issued in 1855. Before adjourning, the Convention of 1850 made arrangements for a Convention to be held on the first Wednesday in May, 1860, by a resolution similar to the one adopted by the Convention of 1840.

The Convention met in 1860, thirty delegates being present, representing: the Maine Medical Association, the Massachusetts Medical Society, the Massachusetts College of Pharmacy, the Connecticut State Medical Society, the Medical Society of the State of New York, the New York Academy of Medicine, the College of Pharmacy of the City of New York, the University of Pennsylvania, the Jefferson Medical College of Philadelphia, the College of Physicians of Philadelphia, the

Philadelphia College of Pharmacy, the Delaware State Medical Society, the University of Maryland, the Maryland College of Pharmacy, the National Medical College of Washington, the Medical Society of the District of Columbia, the United States Army and the United States Navy. George B. Wood, M.D., of Philadelphia, was chosen President.

A Committee of Revision and Publication was appointed, consisting of nine members, including the President of the Convention. To this Committee were referred all communications relating to the revision of the Pharmacopœia. Three members were to form a quorum. The Committee was to meet in Philadelphia and was authorized to publish the work after its revision. The book was published in June, 1863. Before adjourning, the Convention made arrangements, by a resolution similar to that adopted by the Convention of 1850, for a Convention in 1870.

In accordance with this resolution, a Convention met in Washington, Wednesday, May 4, 1870, [illegible] delegates being present, representing the St. Louis Medical College, the Maryland College of Pharmacy, the Missouri Medical College, the St. Louis College of Pharmacy, the Chicago College of Pharmacy, the Medical Society of the District of Columbia, the Medical College of Virginia, the Massachusetts College of Pharmacy, the Medical Society of the State of New York, the College of Physicians of Philadelphia, the College of Pharmacy of the City of New York, the National Medical College of Washington, the University of Pennsylvania, the Jefferson Medical College of Philadelphia, the Philadelphia College of Pharmacy, the College of Pharmacy of Baltimore, [illegible] the Baltimore [illegible] the Medical Department of Georgetown College, [illegible] of Baltimore, the Massachusetts Medical Society, [illegible] of the University of Buffalo, the [illegible] of Maryland, the Baltimore Medical [illegible] the University of Maryland, [illegible] College of [illegible] University, the University of [illegible] Medical College of Philadelphia.

[illegible] regular medical [illegible] of the Bureau [illegible] were invited to take [illegible] Joseph [illegible] President of the Convention. [illegible] consisting of fifteen members [illegible] the general [illegible] the Pharmacopœia.

A resolution was adopted directing "that measures of capacity be abandoned in the Pharmacopœia, and that the quantities in all formulas be expressed in weights and in parts by weight." The Committee of Revision by a unanimous vote decided that the adoption of the principle of parts by weight was impracticable, and definite weights and measures were used in the Pharmacopœia.

Before adjourning, it was resolved that the rules adopted by the Convention of 1860, for the meeting of 1870, be adopted for the Convention of 1880, simply changing the dates.

The fifth revision of the Pharmacopœia was published in 1873.

The next Convention assembled on May 5, 1880, at Washington. There were one hundred and nine delegates accredited from ten Medical Societies, twenty-three Medical Colleges, eleven Pharmaceutical Colleges, and the medical departments of the Army, the Navy, and the Marine Hospital Service. Seventy-five delegates attended the meeting. Dr. Robert Amory, of Boston, was elected President of the Convention.

Important changes were directed at this meeting to be made in the Pharmacopœia, the more prominent ones being the following : all articles were to be arranged in alphabetical order ; a new chemical nomenclature was to be introduced ; quantities were to be stated in "parts by weight," and descriptions of crude drugs and of chemicals were to be made more comprehensive and exact. Numerous tables were also directed to be added to the work. A Committee of Revision was elected, consisting of twenty-five members, and its powers and duties were expressly defined.

Regarding the call to be issued for the Convention of 1890, it was resolved that the President of the Convention of 1880 should, on or about the first day of May, 1889, issue a notice requesting the several incorporated Medical Societies, the incorporated Medical Colleges, the incorporated Colleges of Pharmacy, the incorporated Pharmaceutical Societies throughout the United States, the American Medical Association, and the American Pharmaceutical Association, each to elect a number of delegates, not exceeding three ; the Surgeon-General of the Army, the Surgeon-General of the Navy, and the Surgeon-General of the Marine Hospital Service, each, to appoint not exceeding three medical officers, to attend a General Convention for the Revision of the Pharmacopœia of the United States, to be held in Washington, D.C., on the first Wednesday of May, 1890.

It was also resolved that the several bodies, as well as the Medical Departments of the Army, the Navy, and the Marine Hospital Service, thus addressed, should also be requested by the President to submit the Pharmacopœia to a careful revision and to transmit the result of their labors, through their delegates, to the Committee of Revision, at least three months before the meeting of the Convention.

The several medical and pharmaceutical bodies were further to be requested to transmit to the President of the Convention of 1880 the names and residences of their respective delegates, as soon as they had been appointed ; a list of whom was to be published, under his authority, for the information of the medical public, in the newspapers and medical journals, in the month of March, 1890.

Finally, it was resolved that in the event of the death, resignation, or inability of the President of the Convention to act, these duties should devolve successively, in the following order of precedence : upon the Vice-Presidents, the Secretary, the Assistant Secretary, and the Chairman of the Committee of Revision and Publication of the Pharmacopœia.

The sixth revision of the Pharmacopœia was published at the close of October, 1882.

In accordance with the instructions of the Convention of 1880, the Convention for the Seventh Decennial Revision of the Pharmacopœia of the United States of America met on May 7, 1890, in the City of Washington, one hundred and seventy-five delegates being present, representing the Medical Departments of the United States Army, the United States Navy, the United States Marine Hospital Service, and fifteen Medical Societies or Associations, twenty-three Medical Colleges and Universities, twenty-five Pharmaceutical Associations, and twenty-three Colleges of Pharmacy and Universities.

Dr. Horatio C. Wood, of Philadelphia, was elected President.

It was recommended by the Convention that assay processes should be appended to the United States Pharmacopœial description of the energetic or otherwise important drugs, and to such galenical preparations as the Committee of Revision of the Pharmacopœia should deem wise, especial care being taken that the assay processes for opium and cinchona should be attended with as little manipulative difficulty as possible ; that the standard of purity for drugs should not be above the point of practicability ; that the strength of official tinctures and wines should be ten percent. as far as advisable in the judgment of the Committee ; that no substances protected by proprietary rights, or produced solely under a patented process, should be introduced into the Pharmacopœia.

In regard to weights and measures, the principle of parts by weight was abandoned, and the Committee of Revision was instructed to direct solids to be weighed and liquids to be measured, except in those cases in which the Committee should find it advisable to use weights only : the metric system should be employed.

The Committee of Revision, consisting of twenty-six members, which was elected by the Convention, proceeded to revise the Pharmacopœia in accordance with their instructions, using solely the metric system of weights and measures.

Before its adjournment, the Convention for the Revision of the United States Pharmacopœia directed that the President of this Convention shall, on or about the first day of May, 1899, issue a notice requesting the several bodies represented in the Conventions of 1880 and 1890, and also such other incorporated State Medical and Pharmaceutical Associations, and incorporated Colleges of Medicine and Pharmacy, as shall have been in continuous operation for at least five years immediately preceding, to elect a number of delegates, not exceeding three, and the Surgeon-General of the Army, the Surgeon-General of the Navy, and the Surgeon-General of the Marine Hospital Service, each, to appoint, not exceeding three medical officers, to attend a General Convention for the Revision of the Pharmacopœia of the United States, to be held in Washington, D.C., on the first Wednesday of May, 1900.

The seventh revision of the United States Pharmacopœia was published in September, 1893, and became official January 1, 1894.

ABSTRACT OF THE PROCEEDINGS OF THE NATIONAL CONVENTION OF 1900 FOR REVISING THE PHARMACOPŒIA

EIGHTH DECENNIAL CONVENTION

THE Convention was called to order by President Horatio C. Wood, at 12 M., Wednesday, May 2, 1900, in the Banquet Hall of the Hotel Raleigh, Washington, D.C.

An address of welcome was delivered by the Hon. John B. Wight, District Commissioner.

William S. Thompson, Chairman of the Committee on Credentials, submitted a report, which was subsequently amended, and finally adopted. The following delegates were admitted to seats, either at once, or during the several sessions of the Convention.

LIST OF DELEGATES ACCREDITED TO THE PHARMACOPŒIAL CONVENTION OF 1900

COMPILED BY THE SECRETARY OF THE COMMITTEE ON CREDENTIALS.

American Medical Association.—H. A. Hare, M.D., Warren B. Hill, M.D., A. L. Benedict, M.D.

American Pharmaceutical Association.—William S. Thompson, Phar.D., Alfred R. L. Dohme, Ph.D., Samuel A. D. Sheppard, Ph.G.

United States War Department, Surgeon-General's Office.—Major James C. Merrill, Surgeon, *Major Edward C. Carter, Surgeon, Dr. William M. Mew, Chemist.

United States Department of the Navy, Bureau of Medicine and Surgery.—Medical Director C. H. White, M.D.

United States Treasury Department, Marine Hospital Service.—Surgeon Preston H. Bailhache, M.D., Passed Assistant Surgeon H. D. Geddings, M.D.

Arkansas

Arkansas Association of Pharmacists.—Ernest F. Klein, Ph.G., *William W. Kerr, W. H. Skinner, alternate.

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* Those marked (*) were absent.

California

Medical Society of the State of California.—A. L. Lengfeld, M.D.
California Academy of Medicine.—A. L. Lengfeld, M.D.
University of California, Medical Department.—A. L. Lengfeld, M.D.
California College of Pharmacy.—*John Calvert, Ph.C., Josephine E. Barbat, Ph.G., *Valentine Schmidt.

Colorado

Colorado State Medical Society.—*E. C. Hill, M.D., J. Tracy Melvin, M.D., *W. E. Wilson, M.D.

Connecticut

Connecticut Pharmaceutical Association.—Charles A. Rapelye, Charles W. Whittlesey, *John K. Williams.
Yale University, Medical Department.—Oliver T. Osborne, M.D.

Delaware

Delaware Pharmaceutical Society.—John M. Harvey, Ph.G., Jacob S. Beetem, Ph.G., Francis E. Gallagher.

District of Columbia

Medical Society of the District of Columbia.—Thomas C. Smith, M.D., Murray Galt Motter, M.D., George J. Lochboehler, M.D.
Columbian University, Medical Department.—G. Wythe Cook, M.D., Emil A. de Schweinitz, M.D., *William P. Carr, M.D.
Georgetown University, Medical Department.—G. Lloyd Magruder, M.D., William H. Hawkes, M.D., *John D. Hird.
Howard University, Department of Pharmacy.—William H. Seaman, M.D., J. Herve Purdy, Robert B. Tyler, M.D.
Howard University, Department of Medicine.—*John E. Brackett, M.D., Furmann J. Shadd, M.D., Robert Reyburn, M.D.
National College of Pharmacy.—Samuel L. Hilton, Phar.D., Francis M. Criswell, Phar.D., Frank C. Henry, Phar.D.

Georgia

Medical Association of Georgia.—Henry R. Slack, M.D., *James S. Todd, M.D., *J. B. Morgan, M.D.
Georgia Pharmaceutical Association.—George F. Payne, M.D., Ph.G., Henry R. Slack, M.D., *H. H. Arrington, J. M. Cleveland, Ph.G., alternate.
Atlanta College of Pharmacy.—J. M. Cleveland, Ph.G., *J. W. Gallaway, Ph.G., *W. T. Whitlock, Ph.G.
Atlanta College of Physicians and Surgeons.—George F. Payne, M.D., Ph.G.

Illinois

Illinois Pharmaceutical Association.—Henry Biroth, Ph.G., Albert E. Ebert, Ph.M., Oscar Oldberg, Phar.D.

Chicago College of Pharmacy.—*Francis Marion Goodman, Ph.G., Carl S. N. Hallberg, Ph.G., *William A. Puckner, Ph.D.

Rush Medical College.—Walter S. Haines, M.D., Daniel R. Brower, M.D., Jacob Allen Patton, M.D.

Chicago Medical Society.—*M. F. Clausius, M.D., *Harry Kahn, M.D., A. W. Baer, M.D.

Northwestern University Medical School.—Frank S. Johnson, M.D., N. S. Davis, Jr., M.D., *H. M. Richter, M.D.

Woman's Medical School, Northwestern University.—*Marie J. Mergler, M.D., Josephine Jackson, M.D., Oscar Oldberg, Phar.D.

Northwestern University, School of Pharmacy.—Oscar Oldberg, Phar.D., Albert Schneider, M.D., *Wilhelm Bodemann.

Indiana

Indiana State Medical Society.—*John N. Hurty, M.D., *E. C. Reyer, M.D., Samuel Kennedy, M.D., George W. Sloan, M.D., alternate.

Indiana Pharmaceutical Association.—F. W. Meissner, Ph.G., *John N. Hurty, M.D., *Arthur L. Green, Ph.C., M.D.

Purdue University, School of Pharmacy.—George W. Sloan, M.D., *Robert I. Eads, *Julius W. Sturmer, Ph.G.

Northern Indiana School of Pharmacy.—J. Newton Roe, Sc.D., Ph.G., *Joseph C. Carson, M.D., *John H. Cloud.

Iowa

Iowa Pharmaceutical Association.—Sherman R. Macy, Ph.C., Ph.D., *Edward A. Aldrich, *Ralph C. Hamilton.

State University of Iowa.—Emil R. Boerner, Phar.D., *Thomas Houston Macbride, Ph.D., *Launcelot Winchester Andrews, Ph.D.

Highland Park College of Pharmacy.—Sherman R. Macy, Ph.C., Ph.D.

Kansas

Kansas Pharmaceutical Association.—Lucius E. Sayre, Ph.M., *John T. Moore, M.D., *C. L. Becker, Ph.C.

University of Kansas, School of Pharmacy.—Lucius E. Sayre, Ph.M., *Mrs. M. O. Miner, Ph.G., E. H. S. Bailey, Ph.D.

Kentucky

Kentucky State Medical Society.—Leon L. Solomon, M.D., *William Bailey, M.D., *Philip F. Barbour, M.D.

Kentucky Pharmaceutical Association.—C. Lewis Diehl, Ph.M., *Thomas B. Wood, *Joseph W. Fowler.

Louisville College of Pharmacy.—C. Lewis Diehl, Ph.M., *Emil Scheffer, Ph.G., *F. J. Schweitzer, Ph.G.

Maine

Maine Medical Association.—Charles O. Hunt, M.D., *Alfred Mitchell, M.D., *Addison S. Thayer, M.D.

Medical School of Maine, Bowdoin College.—Charles O. Hunt, M.D.

Maryland

Medical and Chirurgical Faculty of Maryland.—Henry Barton Jacobs, M.D., Samuel J. Fort, M.D., J. Frank Crouch, M.D.

Maryland Pharmaceutical Association.—Charles Caspari, Jr., Ph.G. *A. J. Corning, *Henry P. Hynson, Ph.G., Louis Schulze, Ph.G., alternate.

Maryland College of Pharmacy.—D. M. R. Culbreth, M.D., Charles E. Dohme, Ph.M., Daniel Base, Ph.D.

Baltimore Medical College.—J. Walter Hodges, Ph.G., M.D., William Caspari, Jr., Ph.G., J. Frank Crouch, M.D.

College of Physicians and Surgeons (Baltimore).—*William Simon, Ph.D., M.D., *William F. Lockwood, M.D., Samuel J. Fort, M.D.

Johns Hopkins University, Medical Department.—John J. Abel, M.D.

Massachusetts

Massachusetts Medical Society.—Robert T. Edes, M.D., Bennett F. Davenport, M.D., Frank G. Wheatley, M.D.

Massachusetts State Pharmaceutical Association.—Edgar L. Patch, Ph.G., Charles F. Nixon, Ph.G., William F. Sawyer.

Massachusetts College of Pharmacy.—William W. Bartlet, Ph.G., Wilbur L. Scoville, Ph.G., Eli H. LaPierre, Ph.G., Samuel A. D. Sheppard, Ph.G., alternate.

College of Physicians and Surgeons.—J. E. Leonard, Ph.G., M.D.

Michigan

Michigan State Pharmaceutical Association.—Albert B. Lyons, M.D., *Ottman Eberbach, Ph.G., *Edwin F. Phillips.

University of Michigan, Department of Medicine and Surgery.—Albert B. Prescott, M.D., *Arthur R. Cushny, M.D., *George Dock, M.D.

University of Michigan, School of Pharmacy.—Albert B. Prescott, M.D., Julius O. Schlotterbeck, Ph.C., Ph.D., Alviso B. Stevens, Ph.C.

Detroit College of Medicine, Department of Medicine.—E. M. Houghton, M.D.

Detroit College of Medicine, Pharmacy Department.—John E. Clark, M.D., Charles C. Sherrard, Ph.C., *J. W. T. Knox, Ph.C.

Minnesota

Minnesota State Pharmaceutical Association.—*Frederick J. Wulling, Ph.G.

University of Minnesota, School of Pharmacy.—*Frederick J. Wulling, Ph.G., *Edward M. Freeman, M.S., *Stephen F. Sanderson, Ph.D.

University of Minnesota, College of Medicine and Surgery.—H. M. Bracken, M.D.

Hamline University, College of Physicians and Surgeons.—*C. W. Drew, M.D., *C. W. Williams, M.D., *C. J. Lind, M.D.

Missouri

Medical Association of Missouri.—*V. W. Gayle, M.D., *H. J. Seiving, M.D., Henry M. Whelpley, M.D.

Missouri Pharmaceutical Association.—*Francis Hemm, Ph.G., Henry M. Whelpley, Ph.G., H. M. Pettit, M.D.

Kansas City College of Pharmacy and Natural Sciences.—*W. F. Kuhn, M.D., *Jean Robert Moechel, Ph.D., *James M. Love, Ph.G.

St. Louis College of Pharmacy.—Otto A. Wall, M.D., James M. Good, Ph.M., Charles Gietner, Ph.G.

St. Louis Medical Society.—Henry M. Whelpley, M.D.

Washington University, Medical Department.—*G. Baumgarten, M.D., W. E. Fischel, M.D., *W. A. Hardaway, M.D.

Nebraska

Nebraska State Medical Association.—George H. Simmons, M.D., *W. H. Christie, M.D., *F. A. Long, M.D.

New Jersey

Medical Society of New Jersey.—*W. K. Newton, M.D.

New Jersey Pharmaceutical Association.—William C. Alpers, Ph.C., Charles Holzhauer, Ph.G., George H. White.

New Jersey College of Pharmacy.—P. E. Hommell, M.D., *William S. Disbrow, M.D., Hermann J. Lohmann, Ph.G., F. A Sieker, alternate.

New York

Medical Society of the State of New York.—Eli H. Long, M.D., Reynold Webb Wilcox, M.D., Howard Van Rensselaer, M.D.

New York State Medical Association.—Thomas F. Reilly, M.D.

New York Academy of Medicine.—Edward H. Squibb, M.D., Smith Ely Jelliffe, Ph.D., M.D.

New York State Pharmaceutical Association.—William C. Anderson, M.D., Thomas J. MacMahan, Ph.G., Caswell A. Mayo, Ph.G.

Albany Medical College, Medical Department, Union University.—*Henry Hun, M.D., Howard Van Rensselaer, M.D., Alfred B. Huested, M.D.

Albany College of Pharmacy, Department of Pharmacy, Union University.—Alfred B. Huested, M.D., *Gustavus Michaelis, Ph.G.

Brooklyn Medical Society.—*Albert H. Brundage, Phar.D., M.D., *Elias H. Bartley, Ph.G., M.D., John F. Golding, Ph.G., M.D.

Brooklyn College of Pharmacy.—*Albert H. Brundage, Phar.D., M.D., *Elias H. Bartley, Ph.G., M.D., Walter C. Bryan, M.D.

University of Buffalo, Medical Department.—Eli H. Long, M.D., Edward J. Kiepe, M.D., Harry F. Harrington, Ph.G.

University of Buffalo, College of Pharmacy.—Willis G. Gregory, Ph.G., M.D., John R. Gray, Ph.G., M.D., *John G. Meidenbauer, M.D.

Long Island College Hospital.—*Elias H. Bartley, Ph.G., M.D., Frank E. West, M.D., *J. A. McCorkle, M.D.

Medical Society of the County of Kings.—*Joseph H. Hunt, M.D., John F. Golding, Ph.G., M.D., Robert G. Eccles, M.D.

Kings County Pharmaceutical Society.—William C. Anderson, M.D., A. P. Lohness, Phar.D., *Henry W. Schimpf, M.D.

New York County Medical Association.—J. W. Wainwright, M.D., *Herman N. Biggs, M.D., *John H. Huddleston, M.D., Thomas F. Reilly, M.D., alternate.

College of Pharmacy of the City of New York.—*Charles Rice, Ph.D., Henry H. Rusby, M.D., Virgil Coblentz, Ph.D., Smith Ely Jelliffe, M.D., alternate; George C. Diekman, M.D., alternate.

Cornell University.—Henry P. Loomis, M.D.

Literary and Scientific Society of the German Apothecaries of the City of New York.—Gustave Pfingsten, M.D., George C. Diekman, M.D., Alexander Tscheppe, Ph.D.

New York Post-Graduate Medical School and Hospital.—Thomas E. Satterthwaite, M.D.

North Carolina

North Carolina Pharmaceutical Association. — William Simpson, E. V. Howell, Ph.G., *Henry T. Hicks, Ph.G.

Ohio

Ohio State Pharmaceutical Association.—Theo. D. Wetterstroem, Ph.G., *Frederich W. Herbst, Charles G. Merrell, B.S.

Ohio State University.—George B. Kauffman, Ph.G., *William McPherson.

Northern Ohio Druggists' Association.—Lewis C. Hopp, Ph.G., *William Kuder, Ph.G., C. N. Nye.

University of Cincinnati, Department of Medicine, Medical College of Ohio.—*James G. Hyndman, M.D., *F. Forchheimer, M.D., *B. R. Rachford, M.D.

Cincinnati College of Pharmacy.—*Charles T. P. Fennel, Ph.G., Phar.D., *A. O. Zwick, Ph.G., *Julius H. Eichberg, Ph.G., M.D.

Cleveland School of Pharmacy.—*Joseph Feil, Ph.G., *Harry V. Arny, Ph.G., Ph.D., *Ernest A. Schellentrager.

Scio College, Department of Pharmacy.—James H. Beal, Sc.D.

Pennsylvania

Pennsylvania Pharmaceutical Association.—Clement B. Lowe, M.D., Charles T. George, M.D., Lyman F. Kebler, Ph.G.

Philadelphia County Medical Society.—Henry Beates, M.D., Solomon Solis Cohen, M.D., *Lawrence Wolff, M.D.

College of Physicians of Philadelphia.—Horatio C. Wood, M.D., James C. Wilson, M.D., *Roberts Bartholow, M.D., Richard A. Cleeman, M.D., alternate.

University of Pennsylvania, Department of Medicine.—John Marshall, M.D., Adolph W. Miller, M.D., Horatio C. Wood, Jr., M.D.

Jefferson Medical College of Philadelphia.—*J. W. Holland, M.D., E. Quinn Thornton, M.D., *Charles A. Holder, M.D., L. F. Appleman, M.D., alternate.

Woman's Medical College of Pennsylvania.—*Clara Marshall, M.D., *Henry Leffman, M.D.

Medico-Chirurgical College.—George W. Pfromm, Ph.G., M.D., Henry Fisher, Ph.G., M.D., Harvey H. Mentzer, Ph.G.

Philadelphia College of Pharmacy.—Joseph P. Remington, Ph.M., Samuel P. Sadtler, Ph.D., Henry Kraemer, Ph.D., Joseph W. England, Ph.G., alternate, Frank G. Ryan, Ph.G., alternate.

Alumni Association of the Philadelphia College of Pharmacy.—Frank G. Ryan, Ph.G., Daniel J. Thomas, Ph.G., F. William E. Stedem, Ph.G.

Allegheny County Medical Society.—Adolph Koenig, M.D., J. C. Dunn, M.D., J. I. Johnston, M.D.

Western Pennsylvania Medical College, Medical Department of the Western University of Pennsylvania.—J. C. Dunn, M.D., Henry Finkelpearl, M.D.

Pittsburg College of Pharmacy.—J. A. Koch, Ph.G., Adolph Koenig, M.D., *F. T. Aschman, Ph.B.

South Carolina

South Carolina Medical Association.—John Forrest, M.D., C. P. Aimar, Jr., M.D.

Medical Society of South Carolina.—John Forrest, M.D., C. P. Aimar, Jr., M.D.

Pharmaceutical Association of the State of South Carolina.—O. E. Thomas, Ph.G., Edward S. Burnham, Ph.G.

Medical College of the State of South Carolina, Medical Department.—John Forrest, M.D.

Medical College of the State of South Carolina, Pharmacy Department.—Edward S. Burnham, Ph.G.

South Dakota

South Dakota State Board of Pharmacy and Pharmaceutical Association.—*A. H. Stiles, Ph.G., *D. F. Jones, Ph.G., *W. L. Faust, Ph.G.

Tennessee

Tennessee State Druggists Association.—*C. L. Lockert, A. B. Rains, *J. F. Voigt, E. A. Ruddiman, Ph.M., M.D., alternate.

Vanderbilt University, Medical Department.—J. T. McGill, M.D.

Vanderbilt University, Department of Pharmacy.—E. A. Ruddiman, Ph.M., M.D., J. T. McGill, Ph.D., George C. Childress, Ph.C.

Virginia

Virginia Pharmaceutical Association.—Charles B. Fleet, *William R. Martin, *George E. Barkesdale, M.D., Merten E. Church, alternate.

University College of Medicine, Richmond.—*T. A. Miller, Ph.G., *Jacob Michaux, M.D., *Benjamin Harrison, M.D.

Wisconsin

State Medical Society of Wisconsin.—U. O. B. Wingate, M.D., *Solon Marks, M.D.

Wisconsin Pharmaceutical Association.—Edward Kremers, Ph.D., *Andrew S. Mitchell, Ph.C., *Otto J. S. Boberg, Ph.G.

University of Wisconsin, School of Pharmacy.—Edward Kremers, Ph.D.

Dr. Horatio C. Wood delivered his address as President of the Convention.

The following motion was next adopted:

"That all incorporated medical and pharmaceutical societies and colleges of the United States in existence for five years prior to May 1, 1900, be given representation in this Convention, provided they have all presented their credentials to the Committee on Credentials and Arrangements, or shall have done so before the close of this Convention."

The report of the Committee on President's Address, consisting of Henry M. Whelpley, chairman; Richard A. Cleeman, Joseph P. Remington, S. A. D. Sheppard, and Oscar Oldberg, was next submitted. The recommendations were taken up seriatim and adopted. The report as a whole was then adopted, as follows:

"1. Your committee reports that the recommendation to hereafter divide the work of the Committee on Revision and Publication should be approved.

"2. The proposition that the new Committee of Revision consist of twenty members is not approved.

"Your committee believes that, in view of the greatly increased demand of our country, the number of this Committee should be retained at twenty-five.

"3. The suggestion that the business affairs of the Convention *ad interim* be delegated to a Board of Trustees of five members, together with the two officers mentioned, received our favorable recommendation.

"4. We recommend the incorporation of this body and the adoption of a Constitution and By-Laws at this meeting.

"5. We recommend that the surviving members of the Seventh Revision Committee each receive an honorarium equivalent to twenty-five dollars per year for ten years' service, the same amount to be tendered the heirs of deceased members. This, in our opinion, cannot be regarded as a compensation to the Committee, but as a testimonial for services faithfully performed."

The president named as a committee to prepare a constitution and by-laws: Dr. Henry M. Whelpley; Professors Joseph P. Remington, Oscar Oldberg; Messrs. S. A. D. Sheppard, W. S. Thompson; Drs. R.

A. Cleeman, N. S. Davis, A. B. Lyons, and E. H. Squibb. A report was subsequently submitted and adopted.

Professor Joseph P. Remington, Vice-Chairman of the Committee on Revision of the Seventh Decennial Pharmacopœia, read the following report :

REPORT OF COMMITTEE ON REVISION

To the Convention for Revising the United States Pharmacopœia :

Gentlemen,—It becomes my duty, as Vice-Chairman of the Committee of Revision, in the absence of the Chairman, in accordance with a resolution passed by the Committee of Revision, to make to the Convention a statement which will convey information that may be valuable in the absence of the report of Chairman Charles Rice, Ph.D., who is most unfortunately prevented from attending this meeting on account of serious illness.

This statement must not be regarded as in any way a substitute for the Chairman's general report, for the Committee sincerely trusts that this will be compiled and go on the records when he shall have sufficiently recovered his health to perform this duty.

It will be remembered that in the Convention of 1890 authority was given the Committee of Revision to publish the work at its own expense, making contracts for printing, binding, publishing, and transacting all of the business connected with the issue of the work. That this was a wise proceeding on the part of the Convention may be inferred from the fact that the book has received general commendation from all sources ; that a larger number have been sold than of any previous revision ; that a somewhat larger work than the previous Pharmacopœia was issued ; that the paper, binding, and press-work were better, and the book furnished to the public at the price of two dollars and fifty cents ; four dollars was the price of the Pharmacopœia of 1880.

In addition to this, the Committee has a balance, as shown by the Treasurer's report and a certified statement from the Trust Company in which the funds are deposited, of eleven thousand eight hundred and sixty-one dollars and seventy cents. There are still some small bills unpaid and some receipts yet in possession of the Committee, which will leave a net balance in the hands of the Committee of about twelve thousand dollars.

A considerable sum has been expended by the Committee in research work ; the results of these labors are available, for the next revision of the work, and they will greatly facilitate the work of the next Committee. The greater part of the labor of revision was accomplished by means of correspondence, hectographed circulars being used as the means of communication and for voting purposes. This method entailed on the Chairman of the Committee an immense amount of labor, and the medical and pharmaceutical professions owe a debt of gratitude to our Chairman for the masterly manner in which he performed his arduous duties. An expert was employed to collect from all sources detailed criticisms of the work, and from these, digests were prepared and distributed, which will undoubtedly be of service to the next Committee of Revision, by furnishing readily accessible data for the improvement of such preparations as may have been justly criticised.

The authority vested in the Committee by the last Convention to employ and pay experts, when necessary, was utilized, it being the sense of the Committee that no effort should be spared to make the seventh revision as perfect as possible, and if special knowledge could be secured from any source which would add to the accuracy or completeness of the work, it should be obtained and freely utilized.

It will be remembered that at the last Convention, in 1890, one of the important questions, and one which caused possibly the greatest amount of discussion, was the introduction of assay processes, to be appended to the descriptions of the more energetic or otherwise important drugs containing active principles, provided the therapeutic value of the drug depends upon the amount of these principles, and provided, also, that these principles can be assayed and identified with reasonable accuracy and without requiring complicated processes. The working out of this problem probably caused the Committee as much labor and consumed relatively more time than any other special duty, and while much remains to be done in this department, it may be safely said that progress is being made, and this Convention will be asked to give the next Committee of Revision similar authority, in order that additional reliable assay processes may be introduced into the next revision.

According to the instructions of the Convention of the Seventh Revision, no substance which cannot be produced otherwise than under a patented process, or which is protected by proprietary rights, shall be introduced into the Pharmacopœia. Probably no instruction of the Convention has caused more criticism than this; but it must be remembered that synthetic proprietary remedies were comparatively in their infancy in 1890. But, as is well known, the materia medica has since been deluged with a flood of preparations of this character, and it will doubtless be necessary for the next committee to make a wise selection of synthetic remedies and introduce them into the next revision.

Other interesting subjects connected with the seventh revision will be presented to this Convention through the report of the Committee of Revision on general principles, and it will not be necessary to enlarge further upon the special subjects connected with the revision of the Pharmacopœia. But there are some facts connected with the publication and sale of the book which should be recorded.

When the manuscript copy of the seventh revision was nearly ready for the printer's hands, bids were solicited from various publishing houses for the composition, printing, and binding of the book, and also for putting it upon the market. When the bids were opened, it was found that it would be more advantageous to give the contract for making the book to one publishing house and to put the sale of the work in the hands of a distributing book concern. This plan has proved most satisfactory; a system of checks was devised, whereby the Committee could at any time ascertain exactly how the work of manufacture and sale was progressing. The J. B. Lippincott Company, of Philadelphia, manufactured the book, and P. Blakiston's Son & Co., of Philadelphia, became the agents for its sale.

On November 29, 1899, a very destructive fire occurred at J. B. Lippincott Company's establishment. The stereotyped plates of the work were deposited in the fire-proof vaults of this house. The sub-committee on finance deemed it a wise business precaution to insure these plates against loss by fire, and for a comparatively trifling sum the insurance was effected in July, 1899. Notwithstanding the fact that nearly all of the plates in the fire-proof vaults were entirely protected when the fire came, it happened through a strange accident that the plates of the Pharmacopœia were entirely destroyed.

As soon as these facts were known, the sub-committee made application to the insurance company, proved the loss, and after considerable negotiation succeeded in obtaining the entire amount of the insurance money ($1500). The selling agents were enabled to fill all orders for the book without delay; a contract was executed by the printers for reproducing the plates, and the book has never been out of print.

This statement would be incomplete if reference were not made to the loss by death of seven members of the Committee of Revision during the last ten years, as follows:

Professor Charles O. Curtman, of St. Louis; Professor P. Wendover Bedford, of New York; Professor John M. Maisch, of Philadelphia; Professor George F. H. Markoe, of Boston; Alfred B. Taylor, Ph.M., of Philadelphia; Dr. Thomas F. Wood, of Wilmington, North Carolina.

The mention of these names will revive recollections of these noble men who passed away whilst faithfully discharging their duties as members.

The absence from this meeting of our devoted Chairman will permit the recording at this time of the Committee's great appreciation of the scholarly attainments of Dr. Charles Rice, and of his signal ability in carrying the seventh revision of the Pharmacopœia of the United States of America to a most successful ending.

The Committee of Revision and Publication of the Pharmacopœia of the United States, appointed by the Pharmacopœial Convention of 1890, requests that, owing to the sudden illness of the Chairman, Dr. Charles Rice, and its inability on this account to present a final report to this Convention, the Committee be continued for the sole purpose of closing up the affairs of the seventh revision (1890) and making its final report, and that it be discharged by the President of the Convention of 1900 as soon as this purpose shall have been accomplished.

The Nominating Committee, consisting of one delegate from each body represented, including one each from the Army, Navy, and Marine Hospital Service, reported that eighty-four members were present and had elected S. A. D. Sheppard chairman and Frank G. Ryan secretary. The Committee submitted the following list of names of those to serve as officers of the Convention for the ensuing ten years. On ballot, they were duly elected :

OFFICERS OF THE CONVENTION

President : Horatio C. Wood, M.D., Philadelphia, Pennsylvania.

First Vice-President : *A. B. Prescott, M.D., University of Michigan, Ann Arbor, Mich.

Second Vice-President : Otto A. Wall, M.D., St. Louis, Missouri.

Third Vice-President : Reynold Webb Wilcox, M.D., New York City.

Fourth Vice-President : N. S. Davis, Jr., M.D., Chicago, Illinois.

Fifth Vice-President : A. L. Lengfeld, M.D., San Francisco, California.

Secretary : Henry M. Whelpley, M.D., St. Louis, Missouri.

Assistant Secretary : Murray G. Motter, M.D., Washington, D. C.

Treasurer : *William M. Mew, M.D., U. S. Army Laboratory, Washington, D. C. G. Wythe Cook, M.D., Washington, D. C., was elected Treasurer, November 1, 1902, to fill the vacancy caused by the death of Dr. W. M. Mew, September 19, 1902.

The Committee next submitted the following list of gentlemen to serve as a Board of Trustees, and they were duly elected :

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* Deceased.

BOARD OF TRUSTEES

*William S. Thompson, Phar.D., *Chairman;* Charles E. Dohme, Ph.M., Albert E. Ebert, Ph.M., Samuel A. D. Sheppard, Ph.G., *George W. Sloan, M.D. ; Horatio C. Wood, M.D., *ex officio ;* *Charles Rice, Ph.D., *ex officio ;* (Murray Galt Motter, M.D., *Secretary*).

The Committee next submitted the following list of names to constitute the Committee on Revision of the Pharmacopœia. They were all duly elected :

John J. Abel, M.D., Charles Caspari, Jr., Ph.G., Virgil Coblentz, Ph.D., N. S. Davis, Jr., M.D., C. Lewis Diehl, Ph.M., Alfred R. L. Dohme, Ph.D., James M. Good, Ph.M., Willis G. Gregory, M.D., Walter S. Haines, M.D., Carl S. N. Hallberg, Ph.G., H. A. Hare, M.D., Henry Kraemer, Ph.D., Edward Kremers, Ph.D., A. B. Lyons, M.D., John Marshall, M.D., Oscar Oldberg, Phar.D., George F. Payne, M.D., Joseph P. Remington, Ph.M., *Charles Rice, Ph.D., Samuel P. Sadtler, Ph.D., Lucius E. Sayre, Ph.M., Wilbur L. Scoville, Ph.G., Edward H. Squibb, M.D., Alviso B. Stevens, Ph.C., Reynold Webb Wilcox, M.D. ; Horatio C. Wood, M.D., *ex officio.*

The president called for reports to be referred without debate to the Committee of Revision for 1900. The following were presented : Suggestions for changes in the Pharmacopœia. By C. B. Fleet, Lynchburg, Virginia. A plea for the specific gravity of liquids at 25° C. By Carl C. Hunkel, Chicago, Illinois. Suggestions and recommendations from the following bodies : The Colorado Medical Society, New Jersey College of Pharmacy, Medical Society of the State of New York, Medical Society of South Carolina, American Pharmaceutical Association, New York Academy of Medicine, and the Massachusetts College of Pharmacy. Resolutions were then adopted by the Convention embodying general principles, as follows :

GENERAL PRINCIPLES TO BE FOLLOWED IN REVISING THE PHARMACOPŒIA

In accordance with the instructions of the Convention of 1890, the Committee of Revision created by this body herewith presents a draft of a plan for revising the Pharmacopœia of 1890.

1. *Scope of the Pharmacopœia.*—The Committee of Revision is authorized to admit into the Pharmacopœia any product of nature of known origin ; also any synthetized product of definite composition which is

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* Deceased.

in common use by the medical profession, the identity, purity, or strength of which can be determined. No compound or mixture shall be introduced if the composition or mode of manufacture thereof be kept secret, or if it be controlled by unlimited proprietary or patent rights.

2. *Doses.*—After each pharmacopœial article (drug, chemical, or preparation) which is used or likely to be used internally or hypodermically, the committee is instructed to state the average approximate (but neither a minimum nor a maximum) dose for adults, and where deemed advisable, also for children. The metric system to be used, and the approximate equivalent ordinary weights or measures inserted in parenthesis. It is to be distinctly understood that neither this Convention nor the Committee of Revision created by it intends to have these doses regarded as obligatory on the physician or as forbidding him to exceed them whenever in his judgment this seems advisable. The Committee is directed to make a distinct declaration to this effect in some prominent place in the new Pharmacopœia.

3. *Nomenclature.*—It is recommended that changes in the titles of articles at present official be made only for the purpose of insuring greater accuracy, or safety in dispensing. In the case of newly admitted articles, it is recommended that such titles be chosen as are in harmony with general usage and convenient for prescribing ; but in the case of chemicals of a definite composition a scientific name should be given, at least, as a synonym.

4. *Assay Processes.*—The Committee is instructed to append assay processes to as many of the potent drugs and preparations made therefrom as may be found possible, provided that the processes of assay are reasonably simple (both as to methods and apparatus required) and lead to fairly uniform results in different hands. As regards the products of such assays, tests of identity and purity should be added wherever feasible. Physiological tests for determining strength should not be introduced by the Committee.

5. *Purity and Strength of Pharmacopœial Articles.*—The Committee is instructed to revise as carefully as possible the limits of purity and strength of the pharmacopœial chemicals and preparations for which limiting tests are given. While no concession should be made toward a diminution of medicinal value, allowance should be made for unavoidable, innocuous impurities or variations due to the particular source or mode of preparation, or to the keeping qualities of the several articles. In the case of natural products the limits of admissible impurities should be placed high enough to exclude any that would not be accepted by other countries.

[illegible]

[illegible] United States Pharmacopœia [illegible] commercial [illegible] next issue of the United States Pharmacopœia.

10. It is recommended [illegible] common name and English title of articles used in the present United States Pharmacopœia that is synonymous for both the [illegible] and commercial drug be either discarded or modified [illegible] what is wanted.

11. *Precedents.* In all matters not specially provided for in these General Principles the rules established for previous revisions, if there are any, should be followed.

The following, offered by Dr. William H. Seaman, was referred to the Committee on Revision without recommendation:

"It is recommended that an official medicine dropper have its delivery end three millimeters in external diameter, and adapted to deliver twenty drops of distilled water to a gramme at 15° Centigrade."

On motion by Dr. Henry H. Rusby, the Committee on Revision was requested to consider the advisability of treating of powdered drugs in the text of the Pharmacopœia.

The following motion by Dr. [illegible] was adopted:

Resolved, That the Board of Trustees be authorized, and is hereby [illegible] the incorporation of the United States Pharmacopœial [illegible]

On motion by Prof. Joseph P. Remington, the following resolutions were adopted :

"*Resolved*, That the treasurer of the Committee of Revision of the Pharmacopœia of 1890 be directed to pay over any balance remaining in his hands after the payment of all outstanding debts incurred by the Committee of Revision and Publication of the Pharmacopœia of 1890, and any moneys from any source received hereafter by him, to the treasurer of the United States Pharmacopœial Convention.

"*Resolved*, That the treasurer of the Committee of Revision of the Pharmacopœia of 1890 be directed to pay immediately to the treasurer of the United States Pharmacopœial Convention the sum of one thousand dollars, to be held subject to the order of the Board of Trustees to defray such expenses as may be necessary in carrying on the work of the revision and publication of the Pharmacopœia of 1900.

"*Resolved*, That the Committee of Revision and Publication of the Pharmacopœia of the United States of America for the seventh decennial revision be authorized to direct that the chairman, with the chairman of the Finance Committee, and the treasurer, constitute a committee with full powers to transact all business relating to the closing of their accounts, and the transfer of the balance remaining in the treasurer's hands to the treasurer of the United States Pharmacopœial Convention.

"*Resolved*; That the Board of Trustees be directed to print, bind, and publish the eighth decennial revision of the Pharmacopœia of the United States of America for the account of the United States Pharmacopœial Convention, and to take out the copyright in the name of the Board of Trustees of the United States Pharmacopœial Convention.

"*Resolved*, That the Committee of Revision shall print in a conspicuous place in the book a definite date, reasonably distant from the actual date of publication, announcing when the new Pharmacopœia is intended to go into effect and to supersede the preceding one.

"*Resolved*, That the Committee of Revision be authorized to prepare, and the Board of Trustees be authorized to publish, a supplement to the United States Pharmacopœia, if in the opinion of the Committee of Revision it be deemed advisable.

"*Resolved*, That the Committee of Revision shall report a complete plan for the revision of the Pharmacopœia at the next decennial Convention."

The following resolution, "That this Convention direct the Board of Trustees to permit the use of the United States Pharmacopœia for purpose of comment by all books and commentaries upon the same terms as granted by the Committee of Revision and Publication of the United

States Pharmacopœia of 1890," was referred to the Committee of Revision and Board of Trustees, jointly, for action.

After the adjournment of the Convention the Board of Trustees effected the incorporation of the United States Pharmacopœial Convention.

ARTICLES OF INCORPORATION

In accordance with the instructions of the United States Pharmacopœial Convention of May, 1900, the Board of Trustees directed its Chairman, Mr. W. S. Thompson, of Washington, D. C., to employ an attorney who should take out articles of incorporation for the Convention under the laws of the District of Columbia.

The first difficulty encountered was in the fact that the laws aforesaid require that a majority of the Incorporators be residents of the District of Columbia. This made it, at least, impracticable to include among these Incorporators the Officers and Committee of Revision elected by the Convention. It was then determined to ask the Committee on Credentials and Arrangements to officiate in this capacity, and the treasurer, Dr. W. M. Mew, took the place of Dr. J. E. Brackett, because of the latter's absence from the country.

These preliminaries having been arranged, the following certificate of incorporation was drawn up, signed, and recorded, finally, on the eleventh day of July, 1900 :

CERTIFICATE OF INCORPORATION

This is to certify that we, whose names are hereunto subscribed, citizens of the United States, of full age, and a majority citizens of the District of Columbia, do associate ourselves together pursuant to the provisions of sections 545–552 inclusive of the Revised Statutes of the United States relating to the District of Columbia and of the act of Congress to amend the same, approved the twenty-third day of April, 1884, under the corporate name of The United States Pharmacopœial Convention.

This Association is organized for a period of nine hundred and ninety-nine years.

The particular objects and business of this Association are the encouragement and promotion of the science and art of medicine and pharmacy by selecting by research and experiment and other proper methods and by naming such materials as may be properly used as medicines and drugs with formulas for their preparation ; by establishing one uniform standard and guide for the use of those engaged in the practice of medicine and pharmacy in the United States whereby the identity, strength, and purity of all such medicines and drugs may be accurately determined, and for other like and similar purposes ; and by printing and distributing at suitable intervals such formulas and the results of such and similar selections, names, and determinations among the members of this Association, pharmacists, and physicians generally in the United States and others interested in pharmacy and medicine.

The management and control of the affairs, funds, and property of this Association for the first year of its existence shall be vested in a Board of Trustees consisting of the seven following persons: *

ALBERT E. EBERT.
SAMUEL A. D. SHEPPARD.
WILLIAM S. THOMPSON.
CHARLES E. DOHME.
GEORGE W. SLOAN.
HORATIO C. WOOD.
CHARLES RICE.

In testimony whereof we have hereunto set our hands and affixed our seals this seventh day of July, 1900.

WILLIAM S. THOMPSON. [SEAL]
G. LLOYD MAGRUDER. [SEAL]
JOHN T. WINTER. [SEAL]
THOMAS C. SMITH. [SEAL]
MURRAY G. MOTTER. [SEAL]
WILLIAM M. MEW. [SEAL]
FRANK M. CRISWELL. [SEAL]

Extracts from the Constitution and By-Laws of the United States Pharmacopœial Convention.

CONSTITUTION, ARTICLE II.—MEMBERSHIP

"SECTION 1.—The members of the United States Pharmacopœial Convention, in addition to the incorporators and their associates, shall be delegates elected by the following organizations in the manner they shall respectively provide: Incorporated Medical Colleges, and Medical Schools connected with Incorporated Colleges and Universities; Incorporated Colleges of Pharmacy, and Pharmaceutical Schools connected with Incorporated Universities; Incorporated State Medical Associations; Incorporated State Pharmaceutical Associations; the American Medical Association, the American Pharmaceutical Association, and the American Chemical Society; provided that no such organization shall be entitled to representation unless it shall have been incorporated within, and shall have been in continuous operation in, the United States for at least five years before the time fixed for the decennial meeting of this corporation.

"SECTION 2.—Delegates appointed by the Surgeon-General of the United States Army, the Surgeon-General of the United States Navy,

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* The laws of the District of Columbia with regard to corporations require that the Board of Trustees, or Directors, for the first year shall be named in the Certificate of Incorporation.

and the Surgeon-General of the United States Marine Hospital Service, and by the organizations not hereinbefore named, which were admitted to representation in the Convention of 1900, shall also be members of the corporation. Each body and each branch of the United States Government above mentioned shall be entitled to send three delegates to the meetings of this corporation. But no such delegates as are provided for in this article shall be members until their credentials shall have been examined and acted upon as provided for by the By-Laws. Delegates admitted as members at any decennial meeting shall continue to be members of the United States Pharmacopœial Convention until their successors shall have been appointed and admitted as delegates to the ensuing Convention, and no longer."

CONSTITUTION, ARTICLE V.—MEETINGS

"The regular meetings of this corporation shall be held once in ten years. The time of holding the decennial meeting shall be upon the second Tuesday in May, in the first year in each decade ending in zero, and the place of meeting shall be in the City of Washington, D. C. The first decennial meeting shall be held in the year 1910."

BY-LAWS, CHAPTER I.—OF THE PRESIDENT

"ARTICLE VIII.—He shall issue, on or about the first of May of the year immediately preceding that of the decennial meeting, a notice inviting the several bodies, entitled under the Constitution to representation therein, to send delegates to the next meeting. He shall repeat the notification eight months later, and shall request the medical and pharmaceutical journals of the United States to publish the call for the said meeting."

After a vote of thanks for hospitalities extended to the delegates by the local pharmaceutical and medical professions, the Convention adjourned *sine die*.

PREFACE

THE Committee of Revision of the present Pharmacopœia is an integral part of a chartered organization—the United States Pharmacopœial Convention. The business management is now vested in a Board of Trustees (see page xxx). Chapter 4, Article 2, of the By-Laws provides that "It shall be the duty of the Board of Trustees to invest the funds of the Convention, to execute any and all legal contracts or agreements for the publication of the Pharmacopœia, to pay experts and others for services performed, to transact business involving financial or other matters that may be for the best interests of the Convention, and to perform such other duties as the Convention may from time to time direct."

The work of revision has been conducted mainly on the plan used in the two previous revisions. The labor of the Committee has been enormously increased in many directions, and the wisdom of relieving this body from conducting the financial part of the business by transferring it to the Board of Trustees has been amply justified.

Meetings for conference and joint conferences were held at St. Louis, September 18 and 19, 1901 ; Philadelphia, September 15 and 16, 1902 ; Mackinac, August 6, 1903, and informal meetings at Kansas City, September 5 to 9, 1904, and Longport, October 7 and 8, 1904 ; but, as in previous revisions, by far the largest part of the work was conducted by the communication of reports, motions, etc., by mail. At the beginning, considerable time was spent in perfecting the organization, procuring a charter, and planning the work in accordance with the new conditions. The first circular was issued to the members on May 18, 1900, and after one year's experience it became necessary to enlarge the size of the circulars and to employ a mimeograph, as it afforded a simpler and more legible means of communication.

The scope of the new Pharmacopœia, although generally determined by the Convention (see page xxx) was settled in detail through correspondence, and a provisional list of admissions and expurgations was adopted. The Sub-Committee on Therapeutics, comprising all of the practitioners of medicine on the Committee of Revision, was mainly depended upon for the preparation of this report. The work of revision was continued without interruption up to the time of commencing to put the text in type in July, 1904, and even up to the time of going to press.

The loss by death in the Committee of Revision, Board of Trustees, and among those who have largely assisted in previous revisions, has been serious: Dr. Edward R. Squibb, Brooklyn, died October 25, 1900; Dr. Charles Rice, New York, our beloved Chairman of the Committee of Revision, died after one year's service, on May 13, 1901; Wm. S. Thompson, Washington, Chairman of the Board of Trustees, September 26, 1901; Dr. Wm. M. Mew, Washington, Treasurer, September 19, 1902; Dr. George W. Sloan, Indianapolis, February 15, 1903; Dr. Walter Reed, Washington, Chairman of the Committee on Diphtheria Antitoxin, 1902; Dr. Albert B. Prescott, Ann Arbor, First Vice-President, February 25, 1905.

The necessity for more accurately defining the limit of purity permissible in official chemical substances has been apparent for many years. In the Sixth Decennial Revision this question was met by inserting more definite descriptions with qualitative and quantitative tests. In the Seventh Revision will be found a still greater elaboration of this plan. In the present revision there has been added what has come to be known as the purity standard, or purity "rubric," which is placed in large type immediately before the description, and which defines the percentage of small quantities of permissible, innocuous impurities which do not materially affect medicinal action or interfere with pharmaceutical uses. It is believed that this plan will enable the reader to ascertain at a glance the standard which has been adopted, and which represents what the Committee believes to be obtainable, and which, on the other hand, will not prove burdensome or impossible for the manufacturer to produce without adding unnecessary and excessive cost to the consumer.

The Purity Standard requirements, which limit the quantity of innocuous impurities, are, unless otherwise specified, to be understood as applying to chemical substances which are free from adherent moisture, but an allowance not exceeding 3 percent. of moisture is permitted in non-hygroscopic crystallized chemical salts. Chemical substances in the form of powder or capillary crystals, and all hygroscopic salts are to be dispensed in a condition of sensible dryness. As long as this condition is fulfilled, the moisture present is not to be regarded as an impurity.

In the case of efflorescent salts, the Purity Standard must be understood as applying only to the uneffloresced crystals, and only such should be dispensed.

In some cases it will doubtless be found that the manufacturer can slightly exceed the limit of purity, and if this be the case no objection
be made, the language used being usually "not less than . . . per-
pure salt" (see purity rubric, under Acidum Boricum, page 8).

Inasmuch as there has existed in the past on the part of the public a misconception of the purposes of a pharmacopœia, and penalties have been imposed upon those who have sold substances bearing pharmacopœial names which were to be used in the arts, for manufacturing, and other purposes, and not as medicines, it has become necessary to make the following declaration :

The standards of purity and strength prescribed in the text of this Pharmacopœia are intended to apply to substances which are used solely for medicinal purposes and when professedly bought, sold, or dispensed as such.

The Convention instructed the Committee of Revision "to append assay processes to as many of the potent drugs and preparations made therefrom as it may be found possible, provided that the processes of assay are reasonably simple (both as to methods and apparatus required) and lead to fairly uniform results in different hands." It thus became incumbent upon the Committee to make a thorough study of many assay processes, which led to the introduction of assays for the following drugs and their preparations : Aconite, Belladonna Leaves, Belladonna Root, Cinchona, Red Cinchona, Coca, Colchicum Corm, Colchicum Seed, Conium, Guarana, Hydrastis, Hyoscyamus, Ipecac, Jalap, Nux Vomica, Opium, Physostigma, Pilocarpus, Scopola, and Stramonium. It may readily be seen that many careful investigations by skilled analysts had to be made, and the Sub-committee on Proximate Assays has carefully revised the processes formerly official and added a large number of new ones. Although these occupy considerable space in this Pharmacopœia, it is believed that their introduction is thoroughly justified by the importance of placing in the hands of the physicians assayed preparations, for these are mainly used in important cases where reliability and rapidity of action are demanded. (See page 578, Alkaloidal Assay by Immiscible Solvents.)

The Convention instructed the Committee "to state the average approximate (but neither a minimum nor a maximum) dose for adults, . . . the metric system to be used, and the approximate equivalent ordinary weights or measures inserted in parentheses," and the Committee was further directed to make the following distinct declaration "*that neither this Convention nor the Committee of Revision created by it, intends to have these doses regarded as obligatory on the physician or as forbidding him to exceed them whenever in his judgment this seems advisable.*" This subject was placed in the hands of the Sub-Committee on Therapeutics, and, its amended report having been accepted, doses have been inserted in this revision, it being the first time that they have been incorporated in a United States Pharmacopœia.

It must be recognized that the dose of a drug or preparation can never be regarded as a fixed quantity. The age and condition of a patient must always modify what is known as an average dose, but the doses which have been inserted are intended to furnish a guide to those who are inexperienced in prescribing or who desire to use a drug or preparation with which they are unfamiliar.

Inasmuch as the quantities represent the average dose, it has not been deemed necessary to give strictly exact equivalents in ordinary weights and measures ; the figures for these have therefore been rounded off.

The long controversy, in which chemists in Europe and in this country have been engaged for years regarding the proper unit for the atomic weights of the elements,—*i.e.*, whether it should be Hydrogen = 1 (Oxygen then being 15.88) or Oxygen = 16 (Hydrogen then being 1.008), was settled by the Committee of Revision so far as the Pharmacopœia is concerned, by adopting the standard of Hydrogen = 1, and the figures used for the elements are those of the International Committee on Atomic Weights, published in 1904. This decision, on account of the unsettled condition of the subject, was reached after much debate, and it is believed that it will be most satisfactory to those who will have the greatest use for this Pharmacopœia.

With regard to chemical nomenclature, the Committee has adopted substantially that of the previous revision, notwithstanding the fact that some of the members prefer the spelling frequently used by some chemical writers, as chlorin, bromin, morphin, quinin, sulfate, etc. ; the dropping of the final e for the alkaloids and the halogens was not approved for the reason that its use has become a thoroughly established custom in this country, and it was not deemed wise or safe to sacrifice this distinctive method of designating powerful substances used as medicines.

By a vote of the Convention (see page xxx, Section 1) the Committee was authorized to admit "any synthetized product of definite composition which is in common use by the medical profession, the identity, purity, or strength of which can be determined. No compound or mixture shall be introduced if the composition or mode of manufacture thereof be kept secret, or if it be controlled by unlimited proprietary or patent rights." This action of the Convention, which reversed that of the previous Committee of Revision, placed upon the present Committee a grave responsibility. As is well known, the use of synthetic remedies has greatly increased, and many which are now largely used could not be admitted because of the limitations imposed by the action of the Convention. Some of the synthetic products which have been admitted are still controlled by patents, but these will soon expire on account of the time limit.

Trade names are not used in this Pharmacopœia; it became necessary, however, to abbreviate in a number of cases the long chemical titles of synthetized products, to fit them for use in physicians' prescriptions and pharmaceutical nomenclature. Suitable abbreviations will soon come into use for these, and the inconvenience to physicians and pharmacists caused by the long names will disappear after the abbreviations become familiar.

The extensive use of structural formulas for showing the arrangement of the atoms in chemical compounds seemed to require the introduction of this method of expressing their composition, but inasmuch as empirical formulas have been used in previous revisions of this work, and are convenient in many ways, it was decided to introduce both forms.

The structural formulas adopted by some chemical writers, and which are frequently very complicated, are unsuitable for a work of this character, and upon careful investigation it was shown that there was a diversity of views among chemists as to the arrangement of these structural formulas. Nevertheless, it is believed that the partly analyzed formulas that have been adopted will prove useful additions.

Much difference of opinion exists at present among botanists on the subject of botanical nomenclature, and for this reason the nomenclature of the previous revision has been adopted with slight modification. The rules for botanical nomenclature will be found upon page xxxii of the Pharmacopœia of 1890. In addition to this, it may be stated that in many cases Engler and Prantl have been followed as authorities.

The subject of synonyms has in past years claimed much attention, the general policy being always in the direction of limiting their number as much as possible. In the present revision very few synonyms will be found in the text of the book; in the index, however, they are printed in smaller type under the official Latin titles, and cross references to the synonyms are printed in the ordinary type followed by the official Latin title, so that the reader may find, in proper alphabetical order, the name of the substance or preparation which is regarded as a synonym. It is hoped that physicians and pharmacists will use the Latin or English titles given in the Pharmacopœia, so that synonyms will gradually become obsolete. Much confusion in prescribing and dispensing will in the future be obviated if this hope is realized.

The effort which has been made for many years to establish an International Pharmacopœia has practically been abandoned, but an important conference was held in the City of Brussels in September, 1902, entitled "Conférence Internationale pour l'Unification de la Formule des Médicaments Héroïques," which was composed of delegates from nearly every civilized country. The purpose of this body was to endeavor to formulate standards for potent remedies which would be adopted by the various pharmacopœias of the world, and thus there would be secured the principal object of an international pharmacopœia. The recommendations of this Conference have been adopted by the Committee of Revision, except in one or two instances. This has made necessary a number of changes in the strength of important official preparations (see table, page lxxi).

The adoption of the uniform strength of 10 percent. for the tinctures of potent drugs, has compelled the alteration in strength of many of the tinctures of the Pharmacopœia of 1890. Tincture of Aconite is now practically 10 percent. instead of 35 percent., as in the previous Pharmacopœia; Tincture of Veratrum, 10 percent. instead of 40 percent., as in the previous Pharmacopœia; other changes will be found by consulting the table on page lxxi. A note is appended in the text under the two above-mentioned tinctures, calling attention to the change in strength.

The adoption of the plan of the International Conference necessitated corresponding alterations in the other tinctures, and it may be roughly stated that these preparations are now divided into two classes—potent tinctures 10 percent., and the other tinctures 20 percent.

The standard of 1 percent. for the liquid arsenical preparations and the long established United States Pharmacopœia standard for fluidextracts (1 Cc. representing 1 Gm. of drug) were both adopted by the International Conference.

The strength of Syrup of Ferrous Iodide has been reduced from 10 percent. to 5 percent. in order to conform to the International standard. A number of other changes in strength became necessary for the sake of uniformity, and it is believed that no serious results need be feared; on the contrary, much ultimate good will result from the unification.

As directed by the Convention, the Committee has employed in formulas definite weights for solids, and measures for liquids in terms of the metric system. In certain cases, where weighing is decidedly more convenient, or where the product is adjusted to percentage by weight which would be rendered uncertain if the ingredients were taken by measure, liquids are directed to be weighed, but in some cases the quantities are directed to be taken simply by volume.

The subject of general formulas (see page xxxii, Section 6), after due consideration by the Committee, was not adopted as a principle. In the case of the medicated waters (Aquæ), a general formula was adopted, permitting the use of several methods for preparing this class of preparations (see page 49), and purified talc has been used for the most part in the individual processes in the text. The principal reason for not adopting a general formula for fluidextracts, tinctures, and other classes of preparations, is that it was believed that the saving of space which would be thus secured would be more than offset by the inconvenience to the busy pharmacist of having to turn over several pages and read the general formula every time a preparation is to be made. Moreover, it was believed to be more consistent and appropriate to make the formula for each preparation complete in itself.

The very extensive use of serum products since the last revision made it necessary for the Committee to thoroughly consider the necessity for the introduction of the most important one of these,—namely, Serum Antidiphthericum. While the Convention voted against instructing the Committee of Revision to introduce the serums, there was a persistent demand for the admission of diphtheria antitoxin. Upon careful investigation it was realized that the co-operation of the United States Government was necessary, and in addition, a special committee of bacteriologists was appointed by the Chairman in August, 1902, to consider the whole subject. This Committee (see page xlv), after two years' work, reported unanimously in favor of introducing Antidiphtheric Serum, and proposed a form for its introduction ; other necessary data having been secured from the Department of Public Health and Marine Hospital Service of the United States, which had completed its labors of formulating a standard, based upon that of Ehrlich, the work was considered completed. The delay caused by the large number of necessary experiments is thus believed to be justified by the importance of having an authoritative definition and description for this largely used product.

Two new animal products, Glandulæ Thyroideæ Siccæ and Glandulæ Suprarenales Siccæ, have also been introduced.

The titles of a number of official articles were altered, mostly for the purpose of bringing them into harmony with the principles of nomenclature followed in other parts of the work, or to make them more expressive of the character of the article or preparation which they designate. One of the most important among the changes is that of the Latin name for fluid extracts. This in previous revisions of the Pharmacopœia was, for example, "Extractum Rhei Fluidum," which compelled the intermingling in the text of extracts and fluid extracts, thus, "Extractum Rhei" was placed immediately before "Extractum Rhei Fluidum." Fluid extracts in this revision are found under the letter F, "fluidextractum" being now one word. This separates alphabetically the class of extracts from fluidextracts.

Among the other changes may be mentioned the dropping of the names "Acidum Arsenosum" and "Acidum Chromicum"—"Arseni

Trioxidum" and "Chromii Trioxidum" representing more accurately their chemical character. The name "Acidum Carbolicum" has also been dropped, "Phenol," the more correct chemical name, replacing it; "Chloral" is replaced by the more correct form "Chloralum Hydratum." Other changes will be found by consulting the table on page lxiii.

The word "official" used in this edition of the Pharmacopœia is considered to be synonymous with "pharmacopœial," and is applied to any substance or preparation recognized by the Pharmacopœia.

In the supplementary matter usually placed at the end of the text a number of changes will be noticed. This part of the book has been designated as the Appendix; a table of contents precedes it, and a more systematic arrangement of subjects has been adopted. Much revision was found necessary in this part of the work, and the list of reagents was enlarged. While it is not intended, in any sense, to be didactic, but presupposes a knowledge of elementary chemical analysis, yet the Committee deemed it not out of place to add explanatory remarks or instructions in details of manipulation, in order to render reference to other works, as far as possible, unnecessary.

The Table of Elements and Principal Pharmacopœial Chemicals had to be thoroughly revised, owing to the changes in the figures for the elements as adopted by the International Committee on Atomic Weights (1901). It also became necessary to enlarge this table on account of the introduction of new articles.

With regard to the other tables, it should be stated that they have been prepared by Dr. A. B. Lyons, and much revision has been rendered necessary by the adoption of the new standard temperature for specific gravities of 25° C. (77° F.), expressed as $\frac{25^\circ\text{ C.}}{25^\circ\text{ C.}}$, referring to the fact that the specific gravity of the liquid is taken at 25° C. and compared with pure water at the same temperature. This temperature was adopted for specific gravities and solubilities after much discussion, because it is believed that it will be generally more satisfactory throughout the United States than the former temperature of 15° C. (59° F.), the average temperature of laboratories and stores in the United States throughout the year being nearer 77° F. than 59° F.

The Saturation Tables have been carefully recalculated upon the basis of the adopted standards of strength or percentage of pure substance of the respective acids, alkalies, and salts, and their corresponding revised molecular weights.

It has been customary when quoting any special edition of the Pharmacopœia to designate it by the year in which the Convention authorizing its publication had its meeting (1820, 1830, 1840, etc.); inasmuch as the work of revision has been gradually increasing from one decade to another, and a longer time is now necessary after the meeting of the Convention than formerly, it has been decided to drop this custom and print upon the title-page and the back of the cover of the book merely the words indicating the number of the revision—"Eighth Decennial Revision."

There will be found upon the back of the title-page, as in the previous Pharmacopœia, a coupon, which bears a serial number and a letter and the following words: "Pharmacopœia of the United States of America, Eighth Decennial Revision, Official Copy, Copyright."

A comparison of the number of articles, test solutions, and assays of the present Pharmacopœia with that of 1890, shows that there are 1297 in the present Pharmacopœia, and 1257 in the previous Pharmacopœia. In the present book there are 958 articles in the text, 155 test solutions and volumetric solutions, 149 volumetric assays and 35 gravimetric assays. In the U. S. P. 1890 there were 994 articles in the text, 135 test solutions and volumetric solutions, 114 volumetric assays and 14 gravimetric assays.

Of those articles previously official, 151 have been dismissed, while 117 new ones have been introduced; the titles, "Petrolatum Molle" and "Petrolatum Spissum," have been dropped, one word, "Petrolatum," embracing both, and "Aloe Barbadensis" and "Aloe Socotrina" have been replaced in the same way by "Aloe."

The Committee is greatly indebted to the American Pharmaceutical Association for its annual reports suggesting improvements in the work, and to many gentlemen, not members of it, for most valuable assistance rendered either by undertaking experimental researches, sometimes very protracted and laborious, on certain subjects, or by placing material at its disposal, or by scrutinizing the proof-sheets. Some of them rendered aid from the beginning to the end of the revision.

The Special Committee appointed by the Chairman of the Committee of Revision upon Diphtheria Antitoxin consisted of the following:

Major Walter Reed, Surgeon U. S. A., who was elected chairman; his death occurred a few months after his appointment, and Prof. Theobald Smith, M.D., was elected to succeed him. The remaining members of the committee were Surgeon Thomas C. Craig, U. S. N., H. A. Hare, M.D., E. M. Houghton, M.D., J. J. Kinyoun, M.D., Wm. H. Park, M.D., Herbert D. Pease, M.D., and Surgeon M. J. Rosenau, United States Public Health and Marine Hospital Service.

For general and continuous aid, special thanks are due Prof. J. U. Lloyd, of Cincinnati, Dr. O. A. Wall, of St. Louis, George M. Beringer, Ph.M., of Camden, N. J., and Charles H. LaWall, Ph.M., of Philadelphia.

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Valuable information has been freely placed at the disposal of the Committee by many of the manufacturing firms of this country, and also by several abroad, either voluntarily or in response to queries addressed to them.

Authority was given to the Board of Trustees by the Convention to publish the Pharmacopœia, and all inquiries concerning the use of the text or sale of the book should be addressed to the Chairman of the Board.

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In accordance with the instructions of the Convention, a date has been fixed on which the present work is to supersede the Seventh Revision of the United States Pharmacopœia, and to go into effect. This date is September 1, 1905 (see title-page).

The Committee finally desires to announce that all communications addressed to any member thereof, or to the Chairman, containing suggestions for improvements in the Pharmacopœia, will be thankfully received, carefully considered, and utilized as far as possible.

Since the passage of the National Food and Drugs Act, June 30, 1906, many communications have been received, embodying valuable emendations. The additions and corrections which have been approved by the Committee to June 1, 1907, have been incorporated in this issue of the U. S. Pharmacopœia (8th Rev.).

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Committee of Revision of the Pharmacopœia of the United States of America.
(Eighth Decennial Revision.)

INTRODUCTORY NOTICES

POWDERS

Fineness of Powder.—The fineness of powder is expressed, in the Pharmacopœia, either by descriptive words (generally so in the case of brittle or easily pulverizable substances), or in terms expressing the number of meshes to a linear inch of the sieve through which the powder will pass. The corresponding values, in terms of metric measures of length, are added below in parentheses, but it has not been deemed advisable, in this revision, to substitute them in the text of the Pharmacopœia for those at present in use. The diameter of the wire (gauge number) used in making sieve cloth has an important influence upon the size of the mesh, and it is necessary to specify in each case the thickness of the wire.

These different forms of expression correspond to each other as follows:

A *very fine* powder	should pass through a sieve having 80 or more meshes to the linear inch (30 to the Cm.) and should be made from gauge No. 38 wire.	= No. 80 powder.
A *fine* powder	should pass through a sieve having 60 meshes to the linear inch (24 to the Cm.) and should be made from gauge No. 36 wire.	= No. 60 powder.
A *moderately fine* powder	should pass through a sieve having 50 meshes to the linear inch (20 to the Cm.) and should be made from gauge No. 35 wire.	= No. 50 powder.
A *moderately coarse* powder	should pass through a sieve having 40 meshes to the linear inch (16 to the Cm.) and should be made from gauge No. 33 wire.	= No. 40 powder.
A *coarse* powder	should pass through a sieve having 20 meshes to the linear inch (8 to the Cm.) and should be made from gauge No. 28 wire.	= No. 20 powder.

In certain cases, powders of a different degree of fineness (*e.g.*, No. 30, No. 12) are directed to be taken.

PERCOLATION

Percolation, as directed in this Pharmacopœia, consists in subjecting a substance or a mixture of substances, in powder, contained in a vessel called a *percolator*, to the solvent action of successive portions of a certain menstruum in such a manner that the liquid, as it traverses the powder in its descent to the receiver, shall be charged with the soluble portion of it, and pass from the percolator free from insoluble matter.

When the process is successfully conducted, the first portion of the liquid, or *percolate*, passing through the percolator, will be nearly saturated with the soluble constituents of the substance treated; and if the quantity of menstruum be sufficient for its exhaustion, the last portion of the percolate will be nearly free from color, odor, and taste, other than those of the menstruum itself.

Percolators. The percolator most suitable for the quantities contemplated by this Pharmacopœia should be nearly cylindrical, or slightly conical, with a funnel-shaped termination at the smaller end. The neck of this funnel end should be rather short, and should gradually and regularly become narrower toward the orifice, so that a perforated cork, bearing a short glass tube, may be tightly wedged into it from within until the end of the cork is flush with the outer edge of the orifice. The glass tube, which must not project above the inner surface of the cork, should extend from 3 to 4 Cm. beyond the outer surface of the cork, and should be provided with a closely fitting rubber tube, at least one-fourth longer than the percolator itself, and ending in another short glass tube, whereby the rubber tube may be so suspended that its orifice shall be above the surface of the menstruum in the percolator, a rubber band holding the tube in position.

The shape of a percolator should be adapted to the nature of the drug to be operated upon. For drugs which are apt to swell, particularly when a feebly alcoholic or an aqueous menstruum is employed, a *conical* percolator is preferable. A *cylindrical* or only slightly tapering percolator may be used for drugs which are not liable to swell, and when the menstruum is strongly alcoholic, or when ether or some other volatile liquid is used for extraction. The size of the percolator selected should be in proportion to the quantity of drug extracted. When properly packed in the percolator, the drug should not occupy more than two-thirds of its height. The percolator is best constructed of glass, but, unless otherwise directed, may be made of any suitable material not affected by the drug or menstruum.

The percolator is prepared for percolation by gently pressing a small tuft of cotton into the neck above the cork, and this may then be moistened by pouring a few drops of the menstruum upon the cotton, to facilitate the passage of the first portion of percolate, which is often very dense.

The Process.—The powdered substance to be percolated (which must be uniformly of the fineness directed in the formula, and should be perfectly air-dry before it is weighed) is put into a basin, the specified quantity of menstruum is poured on, and the powder thoroughly stirred with a spatula, or other suitable instrument, until it appears uniformly moistened. The moist powder is then passed through a coarse sieve—No. 40 powders, and those which are finer, requiring a No. 20 sieve, whilst No. 30 powders require a No. 15 sieve for this purpose. Powders of a less degree of fineness usually do not require this additional treatment after the moistening. The moist powder is now transferred to a sheet of thick paper and the whole quantity poured from this into the percolator. It is then shaken down lightly and allowed to remain in that condition for a period varying from fifteen minutes to several hours, unless otherwise directed ; after which the powder is pressed, by the aid of a plunger of suitable dimensions, more or less firmly, in proportion to the character of the powdered substance and the alcoholic strength of the menstruum, strongly alcoholic menstrua, as a rule, permitting firmer packing of the powder than the weaker. The percolator is now placed in position for percolation, and, the rubber tube having been fastened at a suitable height, the surface of the powder is covered by an accurately fitting disk of filtering paper, held in place by a glass stopper or percolator weight, and a sufficient quantity of the menstruum poured on through a funnel reaching nearly to the surface of the paper. If these conditions be accurately observed, the menstruum will penetrate the powder equally until it has passed into the rubber tube and has reached, in this, a height corresponding to its level in the percolator, which is now closely covered to prevent evaporation. The apparatus is then allowed to stand at rest for the time specified in the formula.

To begin percolation, the rubber tube is lowered and its glass end introduced into the neck of a bottle previously marked for the quantity of liquid to be received, if the percolate is to be measured, or of a tared bottle, if the percolate is to be weighed ; and by raising or lowering this receiver the rapidity of percolation may be increased or decreased as may be desirable. A layer of menstruum must constantly be maintained above the powder, so as to prevent the access of air to its interstices, until all has been added, or the requisite quantity of percolate has been obtained. This is conveniently accomplished, if the space above the powder will admit of it, by inverting a bottle containing the entire quantity of menstruum over the percolator in such a manner that its mouth may dip beneath the surface of the liquid, the bottle being of such shape that its shoulder will serve as a cover for the percolator.

When the dregs of a tincture, or of a similar preparation, are to be subjected to percolation, after maceration with all or with the greater portion of the menstruum, the liquid portion should be drained off as completely as possible, the solid portion packed in a percolator, as before described, and the liquid poured on, until all has passed from the surface, when immediately a sufficient quantity of the original menstruum should be poured on to displace the retained liquid, until the prescribed quantity has been obtained.

Repercolation.—Authority is given to employ, where it may be applicable, the process of repercolation, without change of the initial menstruum.

Rate of Flow.—It is obvious that the success of the process of percolation largely depends upon the regulation of the flow of the percolate; if this should be too rapid, incomplete exhaustion will result, but if too slow, valuable time may be wasted. The rate of flow for extracts and fluidextracts for 1000 Gm. of powder should range from two to five drops a minute; for official quantities of tinctures and preparations of about the same strength from eight to fifteen drops a minute, and the word "slowly" throughout the text is understood to mean a rate of flow corresponding to this; it is evident that the proper rate of flow should vary with the quantity and character of the drug employed and the density of the menstruum.

Maceration.—Percolation is not suitable for exhausting some drugs, and the process of maceration is employed for some of the tinctures (Aloes, Asafetida, Sweet Orange Peel, Tolu, etc.). Specific directions will be found under each process, and maceration should be conducted preferably at a temperature of about 15° to 20° C. (59° to 68° F.), and in a shady place.

EXTRACTS

Powdered Extracts.—Specific directions for each preparation of this class will be found in the text; permission is given to employ the dried and powdered marc from the percolation of the same drug as a diluent, in place of powdered peeled Russian licorice root.

Use of Glycerin.—When it is desired to preserve a solid extract (for instance, of Gentian, Taraxacum, etc.) in a plastic condition, suitable for making pills, or for other purposes, it is recommended that there be incorporated with it, after it has been evaporated to the proper consistence, and while it is still warm, 10 percent. of its weight of glycerin.

SPECIFIC GRAVITY

The unit of expression for specific gravities is in any case the specific weight of water of the same temperature. When the specific gravity of any liquid is stated without mentioning the temperature, it is to be understood that the statement refers to the specific gravity which the liquid has at 25° C. (77° F.), referring to water at the same temperature as the unit of expression. When specific gravities are experimentally determined, it is recommended that the Mohr-Westphal balance or a pycnometer be employed, and that the determination be made at 25° C. (77° F.).

TEMPERATURE

When there is occasion to indicate the degree of temperature, the scale of the centigrade mercurial thermometer, or, in its absence, that of Fahrenheit's thermometer, is to be employed. (See the tables on pages 598–602.)

By the term *gentle* heat is meant any temperature between 32° and 38° C. (about 90° to 100° F.).

The standard temperature for the solubility of substances in liquids, for taking specific gravity, and for volumetric operations in this Pharmacopœia is 25° C. (77° F.) ; in the former revision it was 15° C. (59° F.). This change has been made on account of its greater convenience and because it will suit the greatest number of laboratory workers and pharmacists in the United States. In the case of alcohol and wine, however, the temperature of 60° F. (15.667° C.) has been, for the present, retained, since all the laws and regulations of the United States, referring to alcohol and alcoholic liquids in general, are still based on this degree of temperature.

When a liquid is directed to be freed from alcohol or other volatile menstruum, at a limited temperature (as, for instance, in the preparation of extracts), the evaporation may be conducted with greater economy and less risk of injuring the product, by using a vacuum-apparatus of suitable construction.

WEIGHTS AND MEASURES

Weight and volume are in this Pharmacopœia expressed in units of the universal system based upon the Meter, except in cases where only relative quantities are stated, when the proportions are expressed in parts by weight or by volume.

All weights and measures used in this country are now derived from or based upon the United States National Prototype Standards of the

Meter and the Kilogramme, made of platinum-iridium, in the custody of the National Bureau of Standards at Washington.

The value of the United States National Prototype Standard Meter is identical with that of the International Standard Meter derived from the Métre des Archives; and the United States National Prototype Kilogramme like the International Standard Kilogramme is derived from the Kilogramme des Archives.

Theoretically, the Liter is equal to one cubic decimeter, or 1000 cubic centimeters. But the actual liter is the volume of one kilogramme of pure water at the temperature of its maximum density, in vacuo.

The United States yard is defined by the National Bureau of Standards to be equal to $\frac{360000}{393700}$ of a meter. The commercial pound used in the United States is defined as being equal to $\frac{700000000}{1543235639}$ kilogramme. The United States liquid gallon is the volume of 3785.434 grammes (58418.1444 grains) of water at the temperature of its maximum density, weighed in vacuo.*

THE UNITS OF THE METRIC SYSTEM

Linear Measure

The METER is equal to 10 decimeters, or to 100 centimeters, or to 1000 millimeters.

When abbreviated, the term centimeter is written Cm., and the term millimeter Mm.

Measures of Capacity

The LITER is equal to 10 deciliters, or to 100 centiliters, or to 1000 milliliters.

The term milliliter, centiliter, and deciliter are rarely used; but the term cubic centimeter is generally employed to designate the one-thousandth part of a liter. The term cubic centimeter, wherever referred to in this Pharmacopœia, is accordingly to be understood as synonymous with the term milliliter, and, when abbreviated, it is written Cc.

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* While the liquid gallon of the United States is designed to be a volume of 231 cubic inches, it is determined or adjusted by weight on the assumption that the volume of 252.892 grains of water, at its maximum density, weighed in vacuo, is one cubic inch. If the theoretical kilogramme (the weight of one cubic decimeter of water at its maximum density, in vacuo) and the actual International Standard Kilogramme (the equivalent of which, in terms of English weight, is 15432.35639 grains) are identical values, then, as 39.370 inches equal one Meter, the weight of a cubic inch of water at its maximum density, in vacuo, is 252.892 grains, and from this value the weight of 231 cubic inches of water at its maximum density, in vacuo, is found. These values are those employed by the National Bureau of Standards of the United States.

Measures of Weight

The GRAMME is equal to 10 decigrammes, or to 100 centigrammes, or 1000 milligrammes.

The Kilogramme is equal to 1000 grammes.

When abbreviated, the term gramme is written Gm.

In expressing quantities by weight or by measure, in writing, in terms of the Metric System, the common or Arabic numerals are used, and are always placed before the terms or abbreviations designating the units, thus : 10 millimeters ; 2.50 Gm. ; 30 Cc.

OTHER WEIGHTS AND MEASURES

The weights and measures referred to by physicians in prescribing and used by pharmacists in dispensing medicines, are, in the United States, the Apothecaries' Weights and Fluid Measures, and those of the Metric System.

The Apothecaries' Weights and Fluid Measures used are the same as those used in England prior to 1825, the weights being originally derived from the old English Troy Weight, and the Fluid Measures from the Wine Measure.

Apothecaries' Weights

The APOTHECARIES' OUNCE (of the same value as the English Troy ounce) is subdivided as follows :

1 Ounce is equal to 8 drachms, or to 480 grains.
1 Drachm is equal to 3 scruples, or to 60 grains.
1 Scruple is equal to 20 grains.

The APOTHECARIES' GRAIN is identical in value with the Troy grain, the American commercial grain, and the grain of the British Imperial System.

The signs used by physicians in designating units of Apothecaries' Weight are : gr. (which should always be written with a small initial), denoting grain or grains ; ℈, denoting scruple or scruples ; ʒ, denoting drachm or drachms ; and ℥, denoting ounce or ounces.

The numerals indicating the number of weight-units to be taken are, when Apothecaries' Weight is employed, always to be placed after the sign or symbol designating the unit, and in Roman characters, thus : gr. x ; ℈ij ; ʒiss ; ℥vj.

Apothecaries' Fluid Measures

The Apothecaries' Fluid Measures are derived from the Liquid Gallon in use in the United States.

The PINT for liquids is identical in value with the Apothecaries' Pint, which is subdivided into 16 fluidounces.

The fluidounce contains 8 fluidrachms, or 480 minims, the fluidrachm containing 60 minims.

The signs used to designate these units are: ♏, denoting minim, or minims; fʒ, denoting fluidrachm or fluidrachms; and f℥, denoting fluidounce or fluidounces.

The quantities directed to be taken are indicated, in writing, by Roman numerals placed after the signs, as in using Apothecaries' Weight, thus: ♏xxx; fʒiv; f℥viij.

Approximate Measures

These are used by physicians and pharmacists to designate doses of liquid medicines. The following values for approximate measures should be used:

4 Cc. = 1 fluidrachm = 1 teaspoonful.
8 Cc. = 2 fluidrachms = 1 dessertspoonful.
16 Cc. = 4 fluidrachms = 1 tablespoonful.

Customary Commercial Weights and Measures of Capacity in use in the United States

The commercial weights are:

The Pound (also called the Avoirdupois Pound), divided into 16 ounces, or into 7000 grains, each ounce thus containing 437.5 grains.

The commercial measures of capacity for liquids are:

The Liquid Gallon (also called the Wine Gallon), divided into 4 quarts, or 8 pints.

Relations between the Various Units of Weights and Measures in Use

1 Meter is equal to 39.3700 Inches.
1 Yard is equal to 0.914402 Meter.
1 Liter is equal to 0.264170467 Liquid Gallon.
1 Liquid Gallon is equal to 3.785434 Liters.
1 Fluidounce is equal to 29.5737 Milliliters or Cubic Centimeters.
1 Kilogramme is equal to 2.20462 Pounds (Avoirdupois), or to 15432.35639 Grains.
1 Pound (Avoirdupois) is equal to 453.5924277 Grammes.
1 Commercial (Avoirdupois) Ounce is equal to 28.3495 Grammes.
1 Apothecaries' Ounce is equal to 31.10348 Grammes.
1 Grain is equal to 64.7989 Milligrammes.

Comparisons of Weight and Volume

At maximum density, in vacuo.

1 Liter of Water weighs 1 Kilogramme.

1 Gallon of Water weighs 3785.434 Grammes, or 58418.1444 Grains.

1 Fluidounce of Water weighs 29.5737 Grammes, or 456.392 Grains.

1 Apothecaries' Ounce of Water measures 31.10348 Milliliters or Cubic Centimeters, or 504.829 Minims.

ADDITIONAL NOTICES, May 1st, 1907

Products and Preparations Made on a Large Scale

In the manufacture of products and preparations on the large scale, deviation from the official processes may be necessary, but the products must conform to the official requirements as determined by the tests of the U. S. Pharmacopœia, 8th Revision, and the finished preparations must be identical with those made by the official processes.

Tests for Diluted Acids and Exsiccated Salts

Where a requirement is made in this Pharmacopœia in the official description, that a diluted acid "shall respond to the reactions and tests" given under the corresponding stronger acid, or where similar language is employed, it is understood that the diluted acid shall be brought to the strength of the stronger acid before testing, or that the quantities used in testing the diluted acid be so adjusted that it will conform to the same standards as those established for the stronger acid. In the description of dried or exsiccated salts, where similar language is employed, it is understood that the exsiccated salt, before testing, shall have the proper allowance made for the water it has lost during the process of exsiccation.

Solubility Tests

In the solubility tests in this Pharmacopœia, slight mechanical impurities, fragments of filter paper, fibre and minute traces of allowable insoluble impurities, permitted by other tests for the same substance, but which interfere with the transparency of the solution, are not to be construed as vitiating the test for solubility.

LIST OF ARTICLES ADDED TO THE PHARMACOPŒIA

Acetonum
Acetphenetidinum
Acidum Camphoricum
“ Hydriodicum Dilutum
“ Hypophosphorosum
“ Trichloraceticum
Aconitina
Adeps Lanæ
Æthylis Carbamas
“ Chloridum
Ammonii Salicylas
Antipyrina
Aqua Hamamelidis
Aquæ
Benzaldehydum
Benzinum Purificatum
Benzosulphinidum
Berberis
Bismuthi Subgallas
“ Subsalicylas
Bromoformum
Cataplasma Kaolini
Ceratum Resinæ Compositum
Chloralformamidum
Cinnaldehydum
Cocaina
Codeinæ Phosphas
“ Sulphas
Colchicina
Cresol
Elixir Adjuvans
“ Ferri, Quininæ et Strychninæ Phosphatum
Emplastrum Adhæsivum
Emulsum Olei Morrhuæ
“ “ “ cum Hypophosphitibus
“ “ Terebinthinæ
Eugenol
Extractum Malti
Extractum Rhamni Purshianæ
“ Scopolæ
“ Stramonii
“ Sumbul
Fluidextractum Berberidis
“ Euonymi
“ Granati
“ Lobeliæ (acetic acid menstruum)
“ Quercus
“ Quillajæ
“ Rhamni Purshianæ Aromaticum
“ Sanguinariæ (acetic acid menstruum)
“ Scillæ (acetic acid menstruum)
“ Scopolæ
“ Staphisagriæ
“ Stramonii
“ Sumbul
Gambir
Gelatinum
“ Glycerinatum
Glandulæ Suprarenales Siccæ
“ Thyroideæ Siccæ
Glyceritum Ferri, Quininæ et Strychninæ Phosphatum
Guaiacol
Guaiacolis Carbonas
Hamamelidis Cortex
Hexamethylenamina
Homatropinæ Hydrobromidum
Hydrastina
Iodolum
Kaolinum
Liquor Antisepticus
“ Cresolis Compositus
“ Formaldehydi
“ Sodii Phosphatis Compositus

Magnesii Sulphas Effervescens
Maltum
Mangani Hypophosphis
Methylthioninæ Hydrochloridum
Oleatum Atropinæ
  " Cocainæ
  " Quininæ
Opium Granulatum
Paraffinum
Pelletierinæ Tannas
Petrolatum Album
Phenol Liquefactum
Pilocarpinæ Nitras
Pilulæ Laxativæ Compositæ
  " Podophylli, Belladonnæ et Capsici
Pulvis Acetanilidi Compositus
Quininæ Salicylas
Sabal
Safrolum
Scopola
Scopolaminæ Hydrobromidum
Serum Antidiphthericum
Sodii Arsenas Exsiccatus
Sodii Carbonas Monohydratus
Sodii Citras
  " Phosphas Effervescens
  " " Exsiccatus
Strontii Salicylas
Strophanthinum
Strychninæ Nitras
Sulphonethylmethanum
Sulphonmethanum
Syrupus Hypophosphitum Compositus
Talcum
  " Purificatum
Thymolis Iodidum
Tinctura Gambir Composita
  " Limonis Corticis
  " Stramonii
Trochisci Gambir
Unguentum Acidi Borici
  " Hydrargyri Dilutum
  " Stramonii (leaf)
  " Zinci Stearatis
Vanillinum
Vinum Cocæ
Zinci Phenolsulphonas
  " Stearas

LIST OF ARTICLES DISMISSED FROM THE PHARMACOPŒIA

Absinthium
Acidum Carbolicum Crudum
Alcohol Deodoratum
Allium
Ammoniacum
Ammonii Nitras
Antimonii Oxidum
  " Sulphidum
  " " Purificatum
Antimonium Sulphuratum
Argenti Iodidum
Arnicæ Radix
Asclepias
Aspidosperma
Barii Dioxidum
Bryonia
Cascarilla
Castanea
Catechu
Caulophyllum
Ceratum Cetacei
Cetraria
Charta Potassii Nitratis
Chelidonium
Chenopodium
Cinchonina
Cinnamomum Cassia
Crocus
Decoctum Cetrariæ
  " Sarsaparillæ Compositum
Dulcamara
Elixir Phosphori
Emplastrum Ammoniaci cum Hydrargyro
  " Arnicæ
  " Ferri
  " Ichthyocollæ
  " Picis Burgundicæ
  " " Cantharidatum
  " Resinæ
Emulsum Ammoniaci
Extractum Aconiti
  " Arnicæ Radicis
  " " " Fluidum
  " Asclepiadis "
  " Aspidospermatis "
  " Castaneæ "
  " Cinchonæ
  " Colchici Radicis Fluidum
  " Conii
  " Cusso Fluidum
  " Dulcamaræ Fluidum
  " Gossypii Radicis Fluidum
  " Iridis
  " " Fluidum
  " Jalapæ
  " Juglandis
  " Lobeliæ Fluidum (hydro-alcoholic menstruum)
  " Menispermi Fluidum
  " Podophylli
  " Rumicis Fluidum
  " Sanguinariæ Fluidum (hydro-alcoholic menstruum)
  " Scillæ Fluidum (hydro-alcoholic menstruum)
  " Scoparii Fluidum
  " Stramonii Seminis
  " " " Fluidum
  " Uvæ Ursi
Ferri Iodidum Saccharatum
  " Lactas
  " Valerianas
Glyceritum Vitelli
Guaiaci Lignum
Hydrargyri Cyanidum
  " Subsulphas Flavus
Ichthyocolla
Illicium

Infusum Cinchonæ
Inula
Iris
Juglans
Kamala
Linimentum Sinapis Compositum
Liquor Ferri Acetatis
“ “ Citratis
“ “ Nitratis
“ Sodii Silicatis
Macis
Magnesii Citras Effervescens
Massa Copaibæ
Melissa
Menispermum
Oleatum Zinci
Oleum Aurantii Florum
“ Bergamottæ
“ Myrciæ
“ Phosphoratum
“ Sesami
Pepsinum Saccharatum
Phytolaccæ Fructus
Picrotoxinum
Pilulæ Aloes et Asafœtidæ
“ Antimonii Compositæ
“ Rhei
Pix Burgundica
Plumbi Carbonas
Potassa cum Calce
“ Sulphurata
Pulsatilla
Pulvis Antimonialis
Quinidinæ Sulphas
Quininæ Valerianas
Resina Copaibæ
Rhus Toxicodendron
Rosa Centifolia
Rubus Idæus
Rumex
Sambucus
Sodii Carbonas
“ “ Exsiccatus
Spiritus Aurantii
“ Limonis
“ Myrciæ
“ Myristicæ
“ Phosphori
Stramonii Semen
Strontii Lactas
Syrupus Allii
“ Althææ
“ Hypophosphitum cum Ferro
“ Rubi Idæi
Tabacum
Tanacetum
Tinctura Arnicæ Radicis
“ Bryoniæ
“ Catechu Composita
“ Chiratæ
“ Croci
“ Cubebæ
“ Humuli
“ Matico
“ Rhei Dulcis
“ Stramonii Seminis
“ Sumbul
Trochisci Catechu
“ Cretæ
“ Ferri
“ Ipecacuanhæ
“ Menthæ Piperitæ
“ Morphinæ et Ipecacuanhæ
“ Zingiberis
Unguentum Plumbi Carbonatis
“ “ Iodidi
“ Stramonii (seed)
Vinum Colchici Radicis
Vitellus
Zinci Phosphidum

LIST OF CHANGES OF OFFICIAL LATIN TITLES

Pharmacopœia 1890	**Pharmacopœia 8th Revision**
Acidum Arsenosum	Arseni Trioxidum
" Carbolicum	Phenol
" Chromicum	Chromii Trioxidum
Aloe Barbadensis	Aloe
" Socotrina	"
Alumini Hydras	Alumini Hydroxidum
Ammonii Valerianas	Ammonii Valeras
Amyl Nitris	Amylis Nitris
Apomorphinæ Hydrochloras	Apomorphinæ Hydrochloridum
Aqua Chlori	Liquor Chlori Compositus
Argenti Nitras Dilutus	Argenti Nitras Mitigatus
Arnicæ Flores	Arnica
Calx Chlorata	Calx Chlorinata
Chloral	Chloralum Hydratum
Cocainæ Hydrochloras	Cocainæ Hydrochloridum
Colchici Radix	Colchici Cormus
Emplastrum Resinæ	Emplastrum Adhæsivum
Extractum Aconiti Fluidum	Fluidextractum Aconiti
" Apocyni "	" Apocyni
" Aromaticum Fluidum	" Aromaticum
" Aurantii Amari "	" Aurantii Amari
" Belladonnæ Foliorum Alcoholicum	Extractum Belladonnæ Foliorum
" Belladonnæ Radicis Fluidum	Fluidextractum Belladonnæ Radicis
" Buchu Fluidum	" Buchu
" Calami "	" Calami
" Calumbæ "	" Calumbæ
" Cannabis Indicæ Fluidum	" Cannabis Indicæ
" Capsici Fluidum	" Capsici
" Chimaphilæ Fluidum	" Chimaphilæ
" Chiratæ Fluidum	" Chiratæ
" Cimicifugæ Fluidum	" Cimicifugæ
" Cinchonæ "	" Cinchonæ
" Cocæ "	" Cocæ
" Colchici Radicis	Extractum Colchici Cormi
" " Seminis Fluidum	Fluidextractum Colchici Seminis
" Conii Fluidum	" Conii
" Convallariæ Fluidum	" Convallariæ

Pharmacopœia 1890	**Pharmacopœia 8th Revision**
Extractum Cubebæ Fluidum	Fluidextractum Cubebæ
“ Cypripedii Fluidum........	“ Cypripedii
“ Digitalis “	“ Digitalis
“ Ergotæ “	“ Ergotæ
“ Eriodictyi “	“ Eriodictyi
“ Eucalypti “	“ Eucalypti
“ Eupatorii “	“ Eupatorii
“ Frangulæ “	“ Frangulæ
“ Gelsemii “	“ Gelsemii
“ Gentianæ “	“ Gentianæ
“ Geranii “	“ Geranii
“ Glycyrrhizæ “	“ Glycyrrhizæ
“ Grindeliæ “	“ Grindeliæ
“ Guaranæ “	“ Guaranæ
“ Hamamelidis “	“ Hamamelidis Foliorum
“ Hydrastis “	“ Hydrastis
“ Hyoscyami “	“ Hyoscyami
“ Ipecacuanhæ “	“ Ipecacuanhæ
“ Krameriæ “	“ Krameriæ
“ Lappæ “	“ Lappæ
“ Leptandræ “	“ Leptandræ
“ Lobeliæ “	“ Lobeliæ
“ Lupulini “	“ Lupulini
“ Matico “	“ Matico
“ Mezerei “	“ Mezerei
“ Nucis Vomicæ “	“ Nucis Vomicæ
“ Pareiræ “	“ Pareiræ
“ Phytolaccæ Radicis Fluidum	“ Phytolaccæ
“ Pilocarpi Fluidum	“ Pilocarpi
“ Podophylli “	“ Podophylli
“ Pruni Virginianæ Fluidum..	“ Pruni Virginianæ
“ Quassiæ Fluidum	“ Quassiæ
“ Rhamni Purshianæ Fluidum	“ Rhamni Purshianæ
“ Rhei Fluidum	“ Rhei
“ Rhois Glabræ Fluidum	“ Rhois Glabræ
“ Rosæ “	“ Rosæ
“ Rubi “	“ Rubi
“ Sabinæ “	“ Sabinæ
“ Sanguinariæ “	“ Sanguinariæ
“ Sarsaparillæ “	“ Sarsaparillæ
“ “ “ Compositum ..	“ “ Compositum
“ Scillæ Fluidum	“ Scillæ
“ Scutellariæ Fluidum	“ Scutellariæ
“ Senegæ “	“ Senegæ
“ Sennæ “	“ Sennæ
“ Serpentariæ “	“ Serpentariæ
“ Spigeliæ “	“ Spigeliæ

Pharmacopœia 1890	**Pharmacopœia 8th Revision**
Extractum Stillingiæ Fluidum	Fluidextractum Stillingiæ
" Taraxaci "	" Taraxaci
" Tritici "	" Tritici
" Uvæ Ursi "	" Uvæ Ursi
" Valerianæ "	" Valerianæ
" Veratri Viridis Fluidum	" Veratri
" Viburni Opuli "	" Viburni Opuli
" " Prunifolii Fluidum	" " Prunifolii
" Xanthoxyli Fluidum	" Xanthoxyli
" Zingiberis "	" Zingiberis
Ferri Oxidum Hydratum	Ferri Hydroxidum
" " " cum Magnesia	" " cum Magnesii Oxido
Glyceritum Acidi Carbolici	Glyceritum Phenolis
Gossypii Radicis Cortex	Gossypii Cortex
Guaiaci Resina	Guaiacum
Hamamelis	Hamamelidis Folia
Hydrastininæ Hydrochloras	Hydrastininæ Hydrochloridum
Hyoscinæ Hydrobromas	Hyoscinæ Hydrobromidum
Hyoscyaminæ Hydrobromas	Hyoscyaminæ Hydrobromidum
Liquor Potassæ	Liquor Potassii Hydroxidi
" Sodæ	" Sodii Hydroxidi
" " Chloratæ	" Sodæ Chlorinatæ
Magnesia	Magnesii Oxidum
" Ponderosa	" " Ponderosum
Mangani Dioxidum	Mangani Dioxidum Præcipitatum
Mel Despumatum	Mel Depuratum
Methyl Salicylas	Methylis Salicylas
Morphinæ Hydrochloras	Morphinæ Hydrochloridum
Naphtalinum	Naphthalenum
Naphtol	Betanaphthol
Oleum Betulæ Volatile	Oleum Betulæ
Petrolatum Molle	Petrolatum
" Spissum	"
Phytolaccæ Radix	Phytolacca
Pilocarpinæ Hydrochloras	Pilocarpinæ Hydrochloridum
Piperinum	Piperina
Potassa	Potassii Hydroxidum
Potassii Bichromas	" Dichromas
Quercus Alba	Quercus
Quininæ Hydrobromas	Quininæ Hydrobromidum
" Hydrochloras	" Hydrochloridum
Resorcinum	Resorcinol
Salol	Phenylis Salicylas
Sevum	Sevum Preparatum
Soda	Sodii Hydroxidum
Sodii Hyposulphis	" Thiosulphas
" Sulphocarbolas	" Phenolsulphonas
Spiritus Glonoini	Spiritus Glycerylis Nitratis
Stramonii Folia	Stramonium

Pharmacopœia 1890	**Pharmacopœia 8th Revision**
Tinctura Arnicæ Florum	Tinctura Arnicæ
“ Stramonii Seminis	“ Stramonii
“ Veratri Viridis	“ Veratri
Unguentum Acidi Carbolici	Unguentum Phenolis
Veratrum Viride	Veratrum
Vinum Ferri Citratis	Vinum Ferri
Zinci Valerianas	Zinci Valeras

LIST OF CHANGES OF OFFICIAL ENGLISH TITLES

Pharmacopœia 1890	**Pharmacopœia 8th Revision**
Acetanilid	Acetanilide
Alcoholic Extract of Belladonna Leaves	Extract of Belladonna Leaves
Aluminum Hydrate	Aluminum Hydroxide
Ammonium Valerianate	Ammonium Valerate
Apomorphine Hydrochlorate	Apomorphine Hydrochloride
Arnica Flowers	Arnica
Aromatic Fluid Extract	Aromatic Fluidextract
Arsenic Iodide	Arsenous Iodide
Arsenous Acid	Arsenic Trioxide
Barbadoes Aloes	Aloes
Benzin	Petroleum Benzin
Camphorated Tincture of Opium	Camphorated Tincture of Opium, Paregoric
Carbolic Acid	Phenol
Chloral	Hydrated Chloral
Chlorinated Lime	Chlorinated Lime, Chlorinated Calcium Oxide
Chlorine Water	Chlorine Water, Compound Solution of Chlorine
Chromic Acid	Chromium Trioxide
Cocaine Hydrochlorate	Cocaine Hydrochloride
Colchicum Root	Colchicum Corm
Compound Fluid Extract of Sarsaparilla	Compound Fluidextract of Sarsaparilla
Compound Tincture of Catechu	Compound Tincture of Gambir
Diluted Silver Nitrate	Mitigated Silver Nitrate
Dried Ferrous Sulphate	Exsiccated Ferrous Sulphate
Extract of Colchicum Root	Extract of Colchicum Corm
Ferric Hydrate	Ferric Hydroxide
" " with Magnesia	" " with Magnesium Oxide
Fluid Extract of Aconite	Fluidextract of Aconite
" " " Apocynum	" " Apocynum
" " " Belladonna Root	" " Belladonna Root
" " " Bitter Orange Peel	" " Bitter Orange Peel
" " " Buchu	" " Buchu
" " " Calamus	" " Calamus
" " " Calumba	" " Calumba
" " " Capsicum	" " Capsicum
" " " Chimaphila	" " Chimaphila

Pharmacopœia 1890	Pharmacopœia 8th Revision
Fluid Extract of Chirata	Fluidextract of Chirata
“ “ “ Cimicifuga	“ “ Cimicifuga
“ “ “ Cinchona	“ “ Cinchona
“ “ “ Coca	“ “ Coca
“ “ “ Colchicum Seed	“ “ Colchicum Seed
“ “ “ Conium	“ “ Conium
“ “ “ Convallaria	“ “ Convallaria
“ “ “ Cubeb	“ “ Cubeb
“ “ “ Cypripedium	“ “ Cypripedium
“ “ “ Digitalis	“ “ Digitalis
“ “ “ Ergot	“ “ Ergot
“ “ “ Eriodictyon	“ “ Eriodictyon
“ “ “ Eucalyptus	“ “ Eucalyptus
“ “ “ Eupatorium	“ “ Eupatorium
“ “ “ Frangula	“ “ Frangula
“ “ “ Gelsemium	“ “ Gelsemium
“ “ “ Gentian	“ “ Gentian
“ “ “ Geranium	“ “ Geranium
“ “ “ Ginger	“ “ Ginger
“ “ “ Glycyrrhiza	“ “ Glycyrrhiza
“ “ “ Grindelia	“ “ Grindelia
“ “ “ Guarana	“ “ Guarana
“ “ “ Hamamelis	“ “ Hamamelis Leaves
“ “ “ Hydrastis	“ “ Hydrastis
“ “ “ Hyoscyamus	“ “ Hyoscyamus
“ “ “ Indian Cannabis	“ “ Indian Cannabis
“ “ “ Ipecac	“ “ Ipecac
“ “ “ Krameria	“ “ Krameria
“ “ “ Lappa	“ “ Lappa
“ “ “ Leptandra	“ “ Leptandra
“ “ “ Lobelia	“ “ Lobelia
“ “ “ Lupulin	“ “ Lupulin
“ “ “ Matico	“ “ Matico
“ “ “ Mezereum	“ “ Mezereum
“ “ “ Nux Vomica	“ “ Nux Vomica
“ “ “ Pareira	“ “ Pareira
“ “ “ Phytolacca Root	“ “ Phytolacca
“ “ “ Pilocarpus	“ “ Pilocarpus
“ “ “ Podophyllum	“ “ Podophyllum
“ “ “ Quassia	“ “ Quassia
“ “ “ Rhamnus Purshiana	“ “ Cascara Sagrada
“ “ “ Rhubarb	“ “ Rhubarb
“ “ “ Rhus Glabra	“ “ Rhus Glabra
“ “ “ Rose	“ “ Rose
“ “ “ Rubus	“ “ Rubus
“ “ “ Sanguinaria	“ “ Sanguinaria
“ “ “ Sarsaparilla	“ “ Sarsaparilla
“ “ “ Savine	“ “ Savin

Pharmacopœia 1890	**Pharmacopœia 8th Revision**
Fluid Extract of Scutellaria	Fluidextract of Scutellaria
“ “ “ Senega	“ “ Senega
“ “ “ Senna	“ “ Senna
“ “ “ Serpentaria	“ “ Serpentaria
“ “ “ Spigelia	“ “ Spigelia
“ “ “ Squill	“ “ Squill
“ “ “ Stillingia	“ “ Stillingia
“ “ “ Taraxacum	“ “ Taraxacum
“ “ “ Triticum	“ “ Triticum
“ “ “ Uva Ursi	“ “ Uva Ursi
“ “ “ Valerian	“ “ Valerian
“ “ “ Veratrum Viride	“ “ Veratrum
“ “ “ Viburnum Opulus	“ “ Viburnum Opulus
“ “ “ Viburnum Prunifolium	“ “ Viburnum Prunifolium
“ “ “ Wild Cherry	“ “ Wild Cherry
“ “ “ Xanthoxylon	“ “ Xanthoxylon
Glycerin	Glycerin, Glycerol
Glycerite of Carbolic Acid	Glycerite of Phenol
Glycyrrhiza	Glycyrrhiza, Licorice Root
Hamamelis	Hamamelis Leaves
Hard Petrolatum	Petrolatum
Heavy Magnesia	Heavy Magnesia, Heavy Magnesium Oxide
Hydrastinine Hydrochlorate	Hydrastinine Hydrochloride
Hyoscine Hydrobromate	Hyoscine Hydrobromide
Hyoscyamine Hydrobromate	Hyoscyamine Hydrobromide
India-Rubber	Rubber
Lime	Lime, Calcium Oxide
Linseed	Linseed, Flaxseed
Magnesia	Magnesia, Magnesium Oxide
Manganese Dioxide	Precipitated Manganese Dioxide
Morphine Hydrochlorate	Morphine Hydrochloride
Naphtalin	Naphthalene
Naphtol	Betanaphthol
Oil of Cinnamon	Oil of Cinnamon, Oil of Cassia
Ointment of Carbolic Acid	Ointment of Phenol
Phytolacca Root	Phytolacca
Pilocarpine Hydrochlorate	Pilocarpine Hydrochloride
Piperin	Piperine
Potassa	Potassium Hydroxide
Potassium Bichromate	“ Dichromate
Quinine Hydrobromate	Quinine Hydrobromide
“ Hydrochlorate	“ Hydrochloride
Resin	Rosin
“ Cerate	“ Cerate
“ Plaster	Adhesive Plaster
Resorcin	Resorcinol
Rhamnus Purshiana	Cascara Sagrada
Salol	Phenyl Salicylate
Socotrine Aloes	Aloes

Pharmacopœia 1890	**Pharmacopœia 8th Revision**
Soda	Sodium Hydroxide
Sodium Hyposulphite	" Thiosulphate
" Sulphocarbolate	" Phenolsulphonate
Soft Petrolatum	Petrolatum
Solution of Arsenic and Mercuric Iodide	Solution of Arsenous and Mercuric Iodides
" " Lime	Lime Water, Solution of Calcium Hydroxide
" " Potassa	Solution of Potassium Hydroxide
" " Soda	" " Sodium Hydroxide
Spirit of Glonoin	Spirit of Glyceryl Trinitrate, Spirit of Nitroglycerin
Starch	Starch, Corn Starch
Stramonium Leaves	Stramonium
Suet	Prepared Suet
Syrup of Lime	Syrup of Lime, Syrup of Calcium Hydroxide
Tincture of Arnica Flowers	Tincture of Arnica
" " Opium	" " Opium, Laudanum
" " Veratrum Viride	" " Veratrum
Veratrum Viride	Veratrum
Volatile Oil of Betula	Oil of Betula
Whiskey	Whisky
Wine of Ferric Citrate	Wine of Iron
Zinc Valerianate	Zinc Valerate

Comparative Table showing the Strength of the More Important Pharmacopœial Substances and Preparations in the Preceding and in the Present Pharmacopœia

Title.	Chief Constituent.	Pharm. 1890.	Pharm. 8th Revision.
Acidum Sulphuricum Aromaticum	H_2SO_4, by weight	about 18.5 percent.	about 20.0 percent.
Aconitum	Aconitine, by weight	standard not fixed	at least 0.5 "
Alcohol	Absolute Alcohol, by weight	about 91.0 percent.	about 92.3 "
" Dilutum	" " " "	" 41.0 "	" 41.5 "
Belladonnæ Folia	Mydriatic Alkaloids, by weight	standard not fixed	at least 0.3 "
" Radix	" " " "	" " "	" 0.45 "
Caffeina Citrata Effervescens	Citrated Caffeine, by weight	2.0 Gm. in 100 Gm.	4.0 Gm. in 100 Gm.
Calx Chlorinata	Available Chlorine, by weight	at least 35.0 percent.	at least 30.0 percent.
Cinchona	Alkaloids, by weight	at least 2.5 percent. Quinine	at least 4 percent. ether-soluble alkaloids.
Coca	Ether-soluble alkaloids, by weight	standard not fixed	at least 0.5 percent.
Colchici Cormus	Colchicine, by weight	" " "	" 0.35 "
" Semen	" " "	" " "	" 0.45 "
Conium	Coniine, by weight	" " "	" 0.5 "
Emplastrum Belladonnæ	Mydriatic alkaloids, by weight	" " "	not less than 0.38 percent. nor more than 0.42 percent.
Extractum Belladonnæ	" " " "	" " "	1.4 percent.
" Colchici Cormi	Colchicine, by weight	" " "	1.4 "
" Hyoscyami	Mydriatic alkaloids, by weight	" " "	0.3 "
" Nucis Vomicæ	Strychnine, by weight	15.0 percent. total alkaloids	5.0 "
" Opii	Morphine (cryst.), by weight	18.0 percent.	20.0 "
" Physostigmatis	Ether-soluble alkaloids, by weight	standard not fixed	2.0 "

mparative Table showing the Strength of the More Important Pharmacopœial Substances and Preparations in the Preceding and in the Present Pharmacopœia—*Continued*

Title.	Chief Constituent.	Pharm. 1890.	Pharm. 8th Revision.
Extractum Stramonii	Mydriatic alkaloids, by weight	standard not fixed	1.0 percent.
Fluidextractum Aconiti	Aconitine, by weight	" " "	0.4 Gm. in 100 Cc.
" Belladonnæ Radicis	Mydriatic alkaloids, by weight	" " "	0.4 " " 100 "
" Cinchonæ	Anhydrous e.-s. alkaloids, by weight	" " "	4.0 " " 100 "
" Cocæ	Ether-soluble alkaloids, by weight	" " "	0.5 " " 100 "
" Colchici Seminis	Colchicine, by weight	" " "	0.4 " " 100 "
" Conii	Coniine, by weight	" " "	0.45 " " 100 "
" Guaranæ	Alkaloids, by weight	" " "	3.5 " " 100 "
" Hydrastis	Hydrastine, by weight	" " "	2.0 " " 100 "
" Hyoscyami	Mydriatic alkaloids, by weight	" " "	0.075 " " 100 "
" Ipecacuanhæ	Alkaloids, by weight	" " "	1.5 " " 100 "
" Nucis Vomicæ	Strychnine, by weight	1.5 Gm. total alkaloids in 100 Cc.	1.0 " " 100 "
" Pilocarpi	Alkaloids, by weight	standard not fixed	0.4 " " 100 "
" Stramonii	Mydriatic alkaloids, by weight	" " "	0.25 " " 100 "
Guarana	Alkaloids, by weight	" " "	at least 3.5 percent.
Hydrastis	Hydrastine, by weight	" " "	" 2.5 "
Hyoscyamus	Mydriatic alkaloids, by weight	" " "	" 0.08 "
Ipecacuanha	Alkaloids, by weight	" " "	" 1.75 "
Jalap	Alcohol-soluble resin, by weight	12 percent.	" 7.0 "
	Ether-soluble resin, by weight	not more than 1.2 percent.	not more than 15 percent. of the total resin
Liquor Ferri Chloridi	Anhydrous FeCl$_3$, by weight	37.8 percent.	29.0 percent.
" " et Ammonii Acetatis	Tincture of Ferric Chloride	2 Cc. in 100 Cc.	4 Cc. in 100 Cc.
" " Tersulphatis	Fe$_2$(SO$_4$)$_3$, by weight	28.7 percent.	36.0 percent.
Lithii Citras Effervescens	Lithium Citrate, by weight	about 17.0 percent.	about 5.0 percent.
Nux Vomica	Strychnine, by weight	standard not fixed	at least 1.25 percent.

Oleatum Hydrargyri	Yellow Mercuric Oxide, by weight	20.0 percent.	25.0 percent.
Oleum Amygdalæ Amaræ	Benzaldehyde, by weight	standard not fixed	at least 85 percent.
	Hydrocyanic Acid, by weight	" " "	2 to 4 percent.
Oleum Cajuputi	Cineol, by volume	" " "	at least 55 percent.
" Caryophylli	Eugenol, by volume	" " "	" 80 "
" Cinnamomi	Cinnamic Aldehyde, by volume	" " "	" 75 "
" Eucalypti	Cineol, by volume	" " "	" 50 "
" Limonis	Citral, by weight	" " "	" 4 "
" Menthæ Piperitæ	Menthyl Acetate, by weight	" " "	" 6 "
	Total Menthol, by weight	" " "	" 50 "
" Pimentæ	Eugenol, by volume	" " "	" 65 "
" Rosmarini	Bornyl Acetate, by weight	" " "	" 2.5 "
	Total Borneol, by weight	" " "	" 10 "
" Santali	Santalol, by weight	" " "	" 90 "
" Thymi	Phenols, by volume	" " "	" 20 "
Opii Pulvis	Morphine (cryst.), by weight	13 to 15 percent.	12 to 12.5 "
Opium Deodoratum	" " " "	13 " 15 "	12 " 12.5 "
Pancreatinum		standard not fixed	1 part digests at least 25 parts of starch
Physostigma	Ether-soluble alkaloids, by weight	" " "	at least 0.15 percent.
Pilocarpus	Alkaloids, by weight	" " "	" 0.5 "
Potassii Citras Effervescens	Potassium Citrate, by weight	about 48.0 percent.	about 20.0 "
Spiritus Frumenti	Absolute Alcohol, by weight	44 to 50 "	37 to 47.5 "
Stramonium	Mydriatic alkaloids, by weight	standard not fixed	at least 0.25 "
Suppositoria Glycerini	Glycerin, (half their former size)	6 Gm. each	3 Gm. each
Syrupus Ferri Iodidi	Ferrous Iodide, by weight	about 10 percent.	about 5 percent.
Tinctura Aconiti	Aconitine, by weight	standard not fixed	0.045 Gm. in 100 Cc.
	Aconite	1 Gm. in 2.85 Cc.	1 " " 10.0 "
" Aurantii Dulcis	Sweet Orange Peel	1 " " 5.0 "	1 " " 2.0 "
" Belladonnæ Foliorum	Mydriatic alkaloids, by weight	standard not fixed	0.03 " " 100 "
	Belladonna Leaves	1 Gm. in 6.67 Cc.	1 " " 10.0 "

Comparative Table showing the Strength of the More Important Pharmacopœial Substances and Preparations in the Preceding and in the Present Pharmacopœia—*Continued*

Title.	Chief Constituent.	Pharm. 1890.	Pharm. 8th Revision.
Tinctura Benzoini Composita	Benzoin	1 Gm. in 8.33 Cc.	1 Gm. in 10.0 Cc.
" Calumbæ	Calumba	1 " " 10.0 "	1 " " 5.0 "
" Cannabis Indicæ	Indian Cannabis	1 " " 6.67 "	1 " " 10.0 "
" Cantharidis	Cantharides	1 " " 20.0 "	1 " " 10.0 "
" Capsici	Capsicum	1 " " 20.0 "	1 " " 10.0 "
" Cardamomi	Cardamom	1 " " 10.0 "	1 " " 5.0 "
" Cinnamomi	Saigon Cinnamon	1 " " 10.0 "	1 " " 5.0 "
" Colchici Seminis	Colchicum Seed	1 " " 6.67 "	1 " " 10.0 "
	Colchicine, by weight	standard not fixed	0.04 " " 100 "
" Digitalis	Digitalis	1 Gm. in 6.67 Cc.	1 " " 10.0 "
" Ferri Chloridi	Anhydrous $FeCl_3$, by weight	13.6 percent., by weight	13.28 percent., by weight.
" Gambir Composita	Gambir	1 Gm. in 10.0 Cc.	1 Gm. in 20.0 Cc.
" Gelsemii	Gelsemium	1 " " 6.67 "	1 " " 10.0 "
" Hydrastis	Hydrastine, by weight	standard not fixed	0.4 " " 100 "
" Hyoscyami	Mydriatic alkaloids, by weight	" " "	0.007 " " 100 "
	Hyoscyamus	1 Gm. in 6.67 Cc.	1 " " 10.0 "
" Kino	Kino	1 " " 10.0 "	1 " " 20.0 "
" Lobeliæ	Lobelia	1 " " 5.0 "	1 " " 10.0 "
" Nucis Vomicæ	Strychnine, by weight	0.3 Gm. total alkaloids in 100 Cc.	0.1 Gm. strychnine in 100 Cc.
" Opii	Morphine (cryst.), by weight	1.3 to 1.5 Gm. in 100 Cc.	1.2 to 1.25 Gm. in 100 Cc.
" Opii Deodorati	" " " "	1.3 " 1.5 " " 100 "	1.2 " 1.25 " " 100 "
" Physostigmatis	Physostigma	1 Gm. in 6.67 Cc.	1 Gm. in 10.0 Cc.
	Ether-soluble alkaloids, by weight	standard not fixed	0.014 " " 100 "
" Quassiæ	Quassia	1 Gm. in 10.0 Cc.	1 " " 5.0 "

" Rhei	Rhubarb	1 Gm. in 10.0 Cc.	1 Gm. in 5.0 Cc.
" Sanguinariæ	Sanguinaria	1 " " 6.67 "	1 " " 10.0 "
" Scillæ	Squill	1 " " 6.67 "	1 " " 10.0 "
" Serpentariæ	Serpentaria	1 " " 10.0 "	1 " " 5.0 "
" Stramonii	Stramonium	1 " " 6.67 "	1 " " 10.0 "
	Mydriatic alkaloids, by weight	standard not fixed	0.025 " " 100 "
" Strophanthi	Strophanthus	1 Gm. in 20.0 Cc.	1 " " 10.0 "
" Tolutana	Balsam of Tolu	1 " " 10.00 "	1 " " 5.0 "
" Veratri	Veratrum	1 " " 2.5 "	1 " " 10.0 "
Trochisci Cubebæ	Oleoresin of Cubeb, by weight	0.4 Gm. in each	0.2 " " each
Unguentum Chrysarobini	Chrysarobin, by weight	about 5.0 percent.	about 6.0 percent.
" Phenolis	Phenol, by weight	" 5.0 "	" 3.0 "
" Sulphuris	Washed Sulphur, by weight	" 30.0 "	" 15.0 "
Vinum Album	Absolute Alcohol, by weight	10.0 to 14.0 "	7.0 to 12.0 "
" Colchici Seminis	Fluidextract of Colchicum Seed	1 Gm. Colchicum Seed in 6.67 Cc.	1 Cc. Fluidextract of Colchicum Seed in 10.0 Cc.
" Ergotæ	Fluidextract of Ergot	1 Gm. Ergot in 6.67 Cc.	2 Cc. Fluidextract of Ergot in 10.0 Cc.
" Rubrum	Absolute Alcohol, by weight	10.0 to 14.0 percent.	7.0 to 12.0 percent.

THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA

THE

PHARMACOPŒIA

OF THE

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ACACIA

Acacia

A gummy exudation from *Acacia Senegal* Willdenow, and other species of *Acacia* (Fam. *Leguminosæ*).

In roundish tears of various sizes, or broken into angular fragments; whitish or yellowish-white, translucent; very brittle, with a glass-like, sometimes iridescent fracture; nearly inodorous; taste insipid, mucilaginous; insoluble in alcohol; slowly and completely soluble in water, forming an odorless, mucilaginous liquid, which shows an acid reaction with blue litmus paper, yields a gelatinous precipitate with basic lead acetate T.S., ferric chloride T.S., and concentrated solution of sodium borate. It is not colored blue (absence of *starch*) or red (absence of *dextrin*) by iodine T.S., nor does it yield a brownish-black precipitate with ferric chloride T.S., or reduce alkaline cupric tartrate V.S.

The powder contains few, or no starch grains or fragments of vegetable tissues, and yields not more than 4 percent. of ash.

ACETANILIDUM

Acetanilide

$C_8H_9NO = 134.09$

The monacetyl derivative $[C_6H_5NH(CH_3.CO)]$ of aniline.

Colorless, shining, micaceous, crystalline laminæ, or a crystalline powder; odorless, having a slightly burning taste, and permanent in the air.

Soluble in 179 parts of water and in 2.5 parts of alcohol at 25° C. (77° F.); in 18 parts of boiling water, and in 0.4 part of boiling alcohol; also soluble in 12 parts of ether and 5 parts of chloroform at 25° C. (77° F.).

When heated to 113° C. (235.4° F.) Acetanilide melts, and at 295° C. (563° F.) it boils without decomposition.

Upon ignition it is consumed without leaving a weighable residue.

Solutions of Acetanilide in simple solvents are neutral to test-paper.

If 0.5 Gm. of Acetanilide be agitated with 5 Cc. of colorless sulphuric acid in a clean test-tube, it dissolves without imparting color to the liquid.

On heating 0.1 Gm. of Acetanilide with 5 Cc. of concentrated solution of potassium hydroxide (1 in 4), the characteristic odor of aniline becomes noticeable. On now adding 1 Cc. of chloroform, and again heating, the disagreeable odor of phenyl isocyanide (a poisonous product) is evolved (distinction from *methylacetanilide* or *antipyrine*).

On boiling 0.1 Gm. of Acetanilide for several minutes with 2 Cc. of hydrochloric acid, a clear solution results, which, when mixed with 3 Cc. of an aqueous solution of phenol (1 in 20), and afterwards with 5 Cc. of a filtered, saturated solution of chlorinated lime, acquires a brownish-red color, becoming deep blue upon supersaturation with ammonia water.

On heating 0.1 Gm. of Acetanilide with 10 Cc. of water, filtering the solution when cold, and adding bromine T.S., drop by drop, to the filtrate, a whitish precipitate of *parabromacetanilide* is formed (distinction from *antipyrine* or *acetphenetidin*).

A cold saturated, aqueous solution of Acetanilide added to ferric chloride T.S. should not affect the color of the latter (absence of *aniline salts* and *various allied substances*).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

ACETONUM

Acetone

A liquid containing not less than 99 percent., by weight, of absolute Acetone [Dimethyl-ketone, $CH_3.CO.CH_3 = 57.61$]. It should be kept in well-closed vessels in a cool place, remote from lights or fire.

A transparent, colorless, mobile and volatile liquid of a characteristic ethereal odor and a pungent, sweetish taste.

Specific gravity: about 0.790 at 25° C. (77° F.).

Miscible with water in all proportions, without cloudiness; also miscible with alcohol, ether, chloroform, and volatile oils.

It volatilizes at low temperatures and boils from 56° to 57° C. (132.8° to 134.6° F.). It is inflammable and burns with a luminous non-sooty flame.

It should not affect the color of blue or red litmus paper previously moistened with water.

If 50 Cc. of Acetone be evaporated in a clean glass vessel no weighable residue should remain.

If 20 Cc. of Acetone contained in a clean glass-stoppered vial be mixed with 0.1 Cc. of tenth-normal potassium permanganate V.S., the pink tint produced by the admixture should not wholly disappear in less than 15 minutes (limit of *empyreumatic substances*).

ACETPHENETIDINUM

Acetphenetidin

$C_{10}H_{13}NO_2 = 177.79$

A phenol derivative [Acetparaphenetidin, $C_6H_4(OC_2H_5).NH.CH_3.CO1:4$], the product of the acetylization of para-amidophenetol.

White, glistening, crystalline scales or fine crystalline powder, odorless and tasteless.

It is soluble in 925 parts of water, 12 parts of alcohol, 63 parts of ether, and 20 parts of chloroform, at 25° C. (77° F.); in 70 parts of boiling water and in 2 parts of boiling alcohol.

Heated to between 134° and 135° C. (273.2° and 275° F.) it melts, and at a higher temperature burns without leaving a weighable residue.

It dissolves without color in sulphuric acid, but if shaken with nitric acid it is colored yellow, which color persists when heated.

If 0.1 Gm. of Acetphenetidin be boiled for one minute with 1 Cc. of concentrated hydrochloric acid and the solution diluted with 10 Cc. of water, cooled and filtered, it should yield on the addition of 3 drops of an aqueous solution of chromium trioxide (1 in 30) a ruby red color.

On heating 0.1 Gm. of Acetphenetidin with 5 Cc. of a concentrated solution of potassium hydroxide (1 in 4), the odor of aniline should not be perceptible.

If 0.1 Gm. of Acetphenetidin be boiled with 10 Cc. of water it should yield a solution which, when cooled and filtered, should not become turbid upon the addition of bromine T.S. in slight excess (absence of *acetanilide*).

If 0.1 Gm. of Acetphenetidin be boiled for one minute with 3 Cc. of solution of sodium hydroxide (1 in 2), the solution cooled, and then agitated with 5 Cc. of a solution of chlorinated soda, there should be produced a clear yellow liquid, and not a purplish-red or brownish-red cloudy liquid or precipitate (absence of *acetanilide*).

A mixture of 0.3 Gm. of Acetphenetidin with 1 Cc. of 90 percent. alcohol should not acquire a red tint when diluted with three times its volume of water and boiled with one drop of tenth-normal iodine V.S. (absence of *paraphenetidin*).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

ACETUM OPII

Vinegar of Opium

Powdered Opium, *one hundred grammes*	100 Gm.
Myristica, in No. 30 powder, *thirty grammes*	30 Gm.
Sugar, *two hundred grammes*	200 Gm.
Diluted Acetic Acid, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Macerate the Opium and Myristica in *five hundred cubic centimeters* of Diluted Acetic Acid during seven days, frequently stirring; then strain through muslin of close texture, and express the liquid. Mix the residue with *two hundred cubic centimeters* of Diluted Acetic Acid until a uniform magma is produced, then strain and express again. Mix and filter the strained liquids, dissolve the Sugar in the filtrate, and pass enough Diluted Acetic Acid through the filter to make the product measure *one thousand cubic centimeters.*

Average dose.—0.5 Cc. (8 minims).

ACETUM SCILLÆ

Vinegar of Squill

Squill, in No. 20 powder, *one hundred grammes*	100 Gm.
Diluted Acetic Acid, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

White, or yellowish-white, lustrous scales or friable needles, nearly odorless, or having a slight characteristic odor resembling that of benzoin, and an acid, pungent taste: somewhat volatile at a moderately warm temperature, and acquiring a yellow color on exposure to light.

Soluble in 281 parts of water and in 1.8 parts of alcohol at 25° C. (77° F.); in 15 parts of boiling water, and in 1 part of boiling alcohol; also soluble in 3 parts of ether, 7 parts of chloroform, and readily soluble in carbon disulphide, benzene, fixed and volatile oils; sparingly soluble in petroleum benzin.

Benzoic Acid volatilizes freely with the vapor of water. On heating it to 100° C. (212° F.), it begins to sublime. From 120° to 122° C. (248° to 251.6° F.) it melts, and at a higher temperature it is consumed without leaving a residue.

The acid sublimed from benzoin has a lower melting point, and a greater solubility in water, than that prepared artificially.

An aqueous solution of Benzoic Acid colors blue litmus paper red.

On heating Benzoic Acid gradually with 3 parts of freshly slaked lime in a dry test-tube, benzene is evolved.

Benzoic Acid is freely soluble in solutions of alkali hydroxides. On carefully neutralizing such a solution, and adding ferric chloride T.S., previously diluted with 2 volumes of water, and neutralized, if necessary, by ammonia water, a flesh-colored precipitate of ferric benzoate is produced.

A solution of Benzoic Acid in pure, cold sulphuric acid, when gently warmed, should not turn darker than light brown; if it is then poured into water, the Benzoic Acid should separate as a white precipitate, and the liquid should be colorless (absence of *readily carbonizable, organic matters*).

If 0.5 Gm. of the Acid and 0.8 Gm. of calcium carbonate be mixed with a little distilled water in a crucible, the mixture dried, gently ignited, and then dissolved in 20 Cc. of distilled water, with the aid of nitric acid in slight excess, and filtered, the addition of silver nitrate T.S. should not produce much more opalescence than is produced by the same quantity of the same reagent in a solution measuring 20 Cc., prepared by dissolving 0.8 Gm. of the same calcium carbonate in distilled water with the aid of nitric acid (absence of more than traces of *chlorine*).

On warming 0.5 Gm. of the Acid with 5 Cc. of water, and 0.5 Gm. of potassium permanganate in a test-tube, loosely stoppered, and placing it in a water-bath heated to about 45° C. (113° F.) for about ten minutes, then tightly stoppering, and cooling the test-tube with cold water, upon removing the stopper, no odor of oil of bitter almond should be discernible (absence of *cinnamic acid*).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

ACIDUM BORICUM

Boric Acid

$H_3BO_3 = 61.54$

It should contain not less than 99.8 percent. of pure Boric Acid [$B(OH)_3$].

Transparent, colorless scales, of a somewhat pearly lustre, or six-sided, triclinic crystals, or a light, white, very fine powder, slightly unctuous to the touch; odorless, having a faintly bitter taste, and permanent in the air.

Boric Acid is soluble in 18 parts of water, 15.3 parts of alcohol, and 4.6 parts of glycerin at 25° C. (77° F.); in 3 parts of boiling water and 4.3 parts of boiling alcohol. The addition of hydrochloric acid decreases its solubility in water.

When heated to 100° C. (212° F.), Boric Acid loses water, forming metaboric acid (HBO_2), which slowly volatilizes at that temperature.

Heated to 160° C. (320° F.), it fuses to a glassy mass of tetraboric (or pyroboric) acid ($H_2B_4O_7$); at a higher temperature the fused mass swells up, loses all of its water, and becomes boron trioxide (B_2O_3), which fuses into a transparent, hygroscopic, non-volatile mass.

Boric Acid readily volatilizes from a boiling aqueous solution.

Its solution in alcohol or glycerin, when ignited, burns with a flame enveloped with a green-colored mantle.

An aqueous solution of Boric Acid (1 in 50) colors blue litmus paper red, and yellow turmeric paper brownish-red after drying, even when the solution has been acidulated with hydrochloric acid; this brownish-red color is changed to bluish-black by ammonia water.

If 1 Gm. of Boric Acid be added to 10 Cc. of boiling alcohol in a test-tube complete solution should result.

The aqueous solution of the acid (1 in 20) should not at once become more than slightly cloudy after the addition of barium chloride T.S. (limit of *sulphates*); nor immediately more than opalescent by the addition of silver nitrate T.S. with nitric acid (limit of *chlorides*); it should not be precipitated by ammonium oxalate T.S. (absence of *calcium*); nor by sodium phosphate T.S. and ammonia water (*magnesium*), nor respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No 121). 5 Cc. of the saturated aqueous solution should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

In a solution of 1 Gm. of Boric Acid in a mixture of 1 Cc. of hydrochloric acid and 49 Cc. of water, 0.5 Cc. of potassium ferrocyanide T.S. should not at once produce a blue color (limit of *iron*).

One Gm. of Boric Acid, when dissolved in 50 Cc. of distilled water, after the addition of 50 Cc. of glycerin, should require not less than 16.2 Cc. of normal sodium hydroxide V.S., for neutralization (corresponding to at least 99.8 percent. of Boric Acid), phenolphthalein T.S. being used as indicator.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

ACIDUM CAMPHORICUM

Camphoric Acid

$H_2C_{10}H_{14}O_4 = 198.62$

A dibasic organic acid [$C_8H_{14}(COOH)_2$], obtained by the oxidation of camphor.

Colorless, odorless, monoclinic prismatic crystals or plates; melting at 187° C. (368.6° F.); at a higher temperature yielding an anhydride, and ultimately decomposing without leaving any weighable residue.

Soluble in 125 parts of water at 25° C. (77° F.), and in 10 parts of boiling water; readily soluble in alcohol, less soluble in ether and chloroform; soluble in fatty oils.

Camphoric Acid is dextro-rotatory, showing, in 10 percent. alcoholic solution, the value $[\alpha]_D = +47.8°$.

The aqueous solution reddens blue litmus paper.

If 2 Cc. of a saturated aqueous solution of Camphoric Acid be mixed with 2 Cc. of sulphuric acid in a test-tube, and 1 Cc. of a solution made by dissolving 1 Gm. of ferrous sulphate in 2 Cc. of diluted sulphuric acid be poured carefully upon it, no dark-colored zone should develop at the line of contact (absence of *nitric acid*).

Average dose.— 1 Gm. (15 grains).

ACIDUM CITRICUM

Citric Acid

$H_3C_6H_5O_7 + H_2O = 208.50$

A tribasic organic acid [$C_3H_4(OH)(COOH)_3 + H_2O$], usually prepared from the juice of limes or lemons. It should contain not less than 99.5 percent. of pure Citric Acid.

Colorless, translucent, right-rhombic prisms; odorless; having an agreeable, purely acid taste; efflorescent in warm air, and deliquescent when exposed to moist air.

Soluble in 0.54 part of water, and in 1.55 parts of alcohol at 25° C. (77° F.); in about 0.4 part of boiling water, and in 1.43 parts of boiling alcohol; also soluble in 18 parts of ether.

When heated to about 75° C. (167° F.), the Acid begins to lose its water of crystallization; at about 135° C. (275° F.) it becomes anhydrous, and melts between 152° and 153° C. (305.6° and 307.4° F.).

When slowly ignited, it is gradually decomposed without emitting an odor resembling burning sugar (difference from *tartaric acid*), and is finally consumed without leaving more than 0.05 percent. of residue.

An aqueous solution of Citric Acid reddens blue litmus paper.

On adding 1 Cc. of an aqueous solution of the Acid (1 in 10) to 50 Cc. of calcium hydroxide T.S. (or sufficient of the latter to render the mixture alkaline) the liquid remains clear. Upon boiling this for about one minute, it becomes opaque through the precipitation of calcium citrate, which redissolves on cooling.

On mixing 5 Cc. of an aqueous solution of the acid (1 in 10) with a quantity of ammonia water insufficient to neutralize it completely, and adding to this liquid 1 Cc. of ammonium oxalate T.S., it should remain clear (absence of *calcium*).

The aqueous solution (1 in 20), mixed with a few drops of hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121), omitting the subsequent addition of ammonia water.

If to 10 Cc. of the aqueous solution of the Acid (1 in 100) a few drops of hydrochloric acid be added, followed by 1 Cc. of barium chloride T.S., no turbidity should result within five minutes (limit of *sulphuric acid*).

If 5 Gm. of Citric Acid be dissolved in sufficient water to measure 100 Cc., then 34.75 Cc. of this solution should require not less than 24.87 Cc. of normal potassium hydroxide V.S. (each Cc. corresponding to 4 percent. of pure Citric Acid), phenolphthalein T.S. being used as indicator.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

ACIDUM GALLICUM

Gallic Acid

$HC_7H_5O_5 + H_2O = 186.65$

nic acid [$C_6H_2(OH)_3.COOH + H_2O$], usually prepared from
l.

White, or pale fawn-colored, silky, interlaced needles, or triclinic prisms; odorless; having an astringent and slightly acidulous taste; permanent in the air.

Soluble in from 83 to 86 parts of water, and in 4.14 parts of alcohol at 25° C. (77° F.); in 3 parts of boiling water, and in 1 part of boiling alcohol; also soluble in 40 parts of ether, and in 12 parts of glycerin; very slightly soluble in chloroform, benzene, or petroleum benzin.

When heated at 100° C. (212° F.), the Acid loses its water of crystallization (nearly 9.58 percent.). At about 200° C. (392° F.) it begins to melt, and at a higher temperature it is gradually decomposed. At a low red heat it is consumed without leaving a residue.

An aqueous solution of Gallic Acid has an acid reaction upon blue litmus paper.

If 5 Cc. of a cold saturated aqueous solution of the Acid be treated, in a watch-glass, with 6 drops of sodium hydroxide T.S., the liquid will gradually acquire a deep green color, which is changed to reddish or brownish-red by acids.

Gallic Acid neither colors nor precipitates pure ferrous salts, but forms a bluish-black precipitate with ferric salts.

On adding to a cold saturated aqueous solution of Gallic Acid some calcium hydroxide T.S., a bluish-white precipitate will form, where the test solution is temporarily in excess, and will disappear on shaking. When the test solution has been added in excess, the precipitate no longer dissolves, and the liquid acquires a tint which is blue by reflected and green by transmitted light, and becomes pink on the addition of a large excess of calcium hydroxide T.S. (distinction from *tannic acid*).

An aqueous solution of the Acid should not precipitate alkaloids, gelatin T.S., albumin T.S., or starch T.S. (difference from and absence of *tannic acid*).

Average dose.—1 Gm. (15 grains).

ACIDUM HYDRIODICUM DILUTUM

Diluted Hydriodic Acid

A solution of Hydriodic Acid [HI = 126.9], containing not less than 10 percent., by weight, of the absolute Acid, and about 90 percent. of water. It should be kept in amber-colored, glass-stoppered bottles, protected from the light.

Potassium Iodide, *one hundred and thirty-five grammes* . . .	135.0 Gm.
Potassium Hypophosphite, *ten grammes*	10.0 Gm.
Tartaric Acid, *one hundred and thirty-six and five-tenths grammes*	136.5 Gm.
Distilled Water,	
Diluted Alcohol, each, *a sufficient quantity*,	
To make *one thousand grammes* . .	1000 Gm.

Dissolve the Potassium Salts in *two hundred and fifty cubic centimeters* of Distilled Water with the aid of heat, and the Tartaric Acid in *four hundred cubic centimeters* of Diluted Alcohol. Having poured the solution of Tartaric Acid into a bottle of about one thousand cubic centimeters capacity, add the solution of the Potassium Salts and shake the mixture briskly. Place the bottle in a bath of ice-water for several hours and, having inserted a pledget of cotton tightly in the throat of a funnel, transfer the contents of the bottle to the funnel. When all the liquid has passed through, wash the bottle and crystalline precipitate with Diluted Alcohol in successive small portions until *one thousand grammes* of clear solution have been obtained. Evaporate the liquid at a moderate temperature, on a water-bath, until all of the Alcohol has been dissipated, and add sufficient Distilled Water to make the product weigh *one thousand grammes.*

A clear, colorless liquid, odorless, and having an acid taste.

Specific gravity, about 1.106 at 25° C. (77° F.).

Miscible, in all proportions, with water or alcohol.

On distilling Diluted Hydriodic Acid, water with some weak acid first passes over; at the temperature of 127° C. (260.6° F.), an acid of the strength of 57.5 percent. distils over unchanged.

To blue litmus paper it shows a strongly acid reaction.

Silver nitrate T.S. produces a yellow, curdy precipitate, insoluble in nitric acid, almost insoluble in ammonia water, but soluble in solutions of sodium thiosulphate and potassium cyanide.

If a few drops of ferric chloride T.S. or chlorine water be added to the Acid, diluted with twice its volume of water, iodine will be liberated and impart to the solution a reddish-brown color. On agitating the mixture with a few drops of chloroform, the latter will acquire a violet color.

The Acid should not become colored on keeping.

Ten Cc. of the Acid should not be rendered more than slightly cloudy by the addition of 1 Cc. of barium chloride T.S. (limit of *sulphuric acid*).

The Acid should not be rendered turbid by the addition of potassium sulphate T.S. (absence of *barium*).

Diluted Hydriodic Acid, when evaporated to dryness on a bath of boiling water, and then heated to 115° C. (239° F.), should not leave more than 8.3 percent. of residue.

Ten Cc. of the Diluted Acid, without further acidulation, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 5 Cc. of Diluted Hydriodic Acid be measured into a beaker containing 3 Cc. of nitric acid, diluted with about 10 Cc. of water, and then evaporated to dryness on a bath of boiling water, the residue should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Into a flask provided with a well fitting stopper, introduce 2.54 Gm. of Diluted Hydriodic Acid, diluted with 50 Cc. of distilled water, followed by 25 Cc. of tenth-normal silver nitrate V.S., 5 Cc. of ferric ammonium sulphate T.S., and 3 to 4 Cc. of nitric acid (free from nitrous compounds); then securely stopper the flask, and shake it well. Not more than 5 Cc. of tenth-normal potassium sulphocyanate V.S. should then be required to produce a permanent reddish-brown tint (each Cc. of tenth-normal silver nitrate V.S. consumed corresponding to 0.5 percent. of absolute Hydriodic Acid).

Average dose.— 0.5 Cc. (8 minims).

ACIDUM HYDROBROMICUM DILUTUM

Diluted Hydrobromic Acid

A liquid composed of not less than 10 percent., by weight, of absolute Hydrobromic Acid [$\mathrm{HBr} = 80.36$], and about 90 percent. of water. It should be kept in amber-colored, glass-stoppered bottles, protected from light.

A clear, colorless and odorless liquid, having a strongly acid taste.

Specific gravity: about 1.076 at 25° C. (77° F.).

Miscible, in all proportions, with water or alcohol.

On distilling it, water and weak acid first pass over; when the temperature of 126° C. (258.8° F.) is reached, an acid of 48 percent. remains, which may be distilled unchanged.

Diluted Hydrobromic Acid strongly reddens blue litmus paper.

Silver nitrate T.S. causes a yellowish-white precipitate, which is insoluble in diluted nitric acid, but slowly soluble in an excess of stronger ammonia water, and readily soluble in solutions of sodium thiosulphate or potassium cyanide.

If copper sulphate T.S. be added to the Acid, a deep red color is produced upon the addition of sulphuric acid.

The Acid should not become colored on keeping.

Ten Cc. of the Acid should not be rendered more than slightly cloudy by the addition of 1 Cc. of barium chloride T.S. (limit of *sulphuric acid*).

Ten Cc. of the Acid should not be rendered turbid by the addition of 1 Cc. of potassium sulphate T.S. (absence of *barium*).

If 10 Cc. of Diluted Hydrobromic Acid be evaporated to dryness, and heated to 110° C. (230° F.), no appreciable residue should remain (limit of *non-volatile impurities*).

Ten Cc. of the Diluted Acid without further acidulation, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 10 Cc. of the Acid be shaken with 2 Cc. of chloroform, no color should be imparted to the latter (absence of *free bromine*), and upon subsequently adding chlorine water, which has been previously diluted with an equal volume of water, drop by drop, with shaking, the chloroform should be colored orange, with no trace of violet (absence of *iodine*).

Five Cc. of Diluted Hydrobromic Acid should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 0.5 Cc. of Diluted Hydrobromic Acid be mixed with 10 Cc. of water, and 8 Cc. of silver nitrate T.S. with 6 Cc. of ammonium carbonate T.S. be added, and if the mixture, after digesting for ten minutes on a bath of boiling water, be cooled and filtered, the filtrate, on supersaturating with nitric acid, should not become more than slightly opalescent (limit of *hydrochloric acid* and *chlorides*).

If 10 Gm. of Diluted Hydrobromic Acid be diluted with sufficient distilled water to measure 100 Cc., and if to 8.04 Cc. of this solution, after exact neutralization with diluted ammonia water (litmus T.S. being used as indicator), there be added 3 drops of potassium chromate T.S., then not less than 10 Cc. of tenth-normal silver nitrate V.S. should be required to impart to the liquid a permanent red tint (each Cc. corresponding to 1 percent. of absolute Hydrobromic Acid).

Average dose.—4 Cc. (1 fluidrachm).

ACIDUM HYDROCHLORICUM

Hydrochloric Acid

A liquid composed of 31.9 percent., by weight, of absolute Hydrochloric Acid [$HCl = 36.18$], and 68.1 percent. of water. It should be kept in glass-stoppered bottles.

A colorless, fuming liquid, of a pungent odor, and an intensely acid taste; the fumes and odor disappear on diluting the Acid with 2 volumes of water.

Specific gravity: about 1.158 at 25° C. (77° F.).

Miscible, in all proportions, with water or alcohol.

On distilling it, at first a stronger acid passes over, until, at 110° C. (230° F.), a liquid containing 20.13 percent. of the absolute acid remains (specific gravity, about 1.098 at 25° C.), which distils unchanged, leaving no residue.

Hydrochloric Acid, even when highly diluted, shows an intensely acid reaction with blue litmus paper.

Heated with manganese dioxide it evolves chlorine.

With silver nitrate T.S. it yields a white, curdy precipitate, insoluble in nitric acid, but readily soluble in ammonia water.

If 10 Cc. of the Acid be evaporated from a platinum or porcelain dish, and dried at 110° C. (230° F.), no appreciable residue should remain (limit of *non-volatile impurities*).

If to 5 Cc. of Hydrochloric Acid diluted with an equal volume of water, 1 Cc. of chloroform be added, and if chlorine water which has been diluted with an equal volume of water be then cautiously added, a drop at a time, with constant agitation, the chloroform should remain free from any yellow, orange, or violet color (absence of *bromine* or *iodine*).

If 1 Cc. of the Acid be diluted with 5 Cc. of water, and if 1 Cc. of potassium iodide T.S. with 1 Cc. of chloroform be added, and the mixture agitated, the chloroform should be free from any violet coloration (absence of *free chlorine* or *bromine*).

Five Cc. of diluted Hydrochloric Acid (1 in 10), should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 1 Cc. of the Acid be diluted with 5 Cc. of water, and a few drops of barium chloride T.S., be added, no precipitate or turbidity should appear within one hour (absence of *sulphuric acid* or *sulphates*), nor should the addition to this mixture of a few drops of tenth-normal iodine V.S. produce any turbidity (absence of *sulphurous acid*).

Hydrochloric Acid when diluted with distilled water (1 in 20) should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Introduce into a stoppered weighing-bottle 3 Cc. of Hydrochloric Acid and weigh accurately. Dilute the Acid with 50 Cc. of distilled water and titrate with normal potassium hydroxide V.S., using methyl-orange T.S. as indicator. Multiply the number of Cc. of the normal potassium hydroxide V.S. consumed, by 3.618, and divide this product by the weight of the Acid taken; the quotient represents the percentage of absolute Hydrochloric Acid in the latter.

ACIDUM HYDROCHLORICUM DILUTUM

Diluted Hydrochloric Acid

Diluted Hydrochloric Acid should contain 10 percent., by weight, of absolute Hydrochloric Acid [$HCl = 36.18$], and 90 percent. of water. It should be kept in glass-stoppered bottles.

Hydrochloric Acid, *one hundred grammes*	100 Gm.
Distilled Water, *two hundred and nineteen grammes*	219 Gm.
To make *three hundred and nineteen grammes*	319 Gm.

Mix them.

Specific gravity: about 1.049 at 25° C. (77° F.).

It does not fume in the air and is without odor, but otherwise it should conform to the reactions and tests given under *Acidum Hydrochloricum*.

If to 3.62 Gm. of Diluted Hydrochloric Acid there be added about 20 Cc. of water, it should require 10 Cc. of normal potassium hydroxide V.S. for neutralization (each Cc. corresponding to 1 percent. of absolute Hydrochloric Acid), methyl-orange T.S. being used as indicator.

Average dose.— 1 Cc. (15 minims).

ACIDUM HYDROCYANICUM DILUTUM

Diluted Hydrocyanic Acid

A liquid composed of not less than 2 percent., by weight, of absolute Hydrocyanic Acid [$HCN = 26.84$], and about 98 percent. of water. It should be kept in small, dark amber-colored, cork-stoppered vials in a cool place. It may be prepared extemporaneously by the following process:

Silver Cyanide, *six grammes*	6.00 Gm.
Diluted Hydrochloric Acid, *fifteen and fifty-four-hundredths cubic centimeters*	15.54 Cc.
Distilled Water, *forty-four and one-tenth cubic centimeters*	44.10 Cc.

Mix the Diluted Hydrochloric Acid with the Distilled Water, add the Silver Cyanide, and shake the whole together in a glass-stoppered bottle. When the precipitate has subsided, pour off the clear liquid.

A colorless liquid, of a characteristic odor resembling that of bitter almonds. On account of its poisonous character *it should be tasted with great caution.*
It is completely volatilized by heat.
Diluted Hydrocyanic Acid shows an acid reaction with blue litmus paper.
If to 1 Cc. of the Acid, rendered alkaline by potassium hydroxide T.S., a few drops of ferrous sulphate T.S. be added, and the mixture boiled and then acidulated with hydrochloric acid, a blue precipitate will be formed.
If 5 Gm. of Diluted Hydrocyanic Acid be diluted with distilled water to measure 50 Cc., then 26.9 Cc. (26.84 Cc.) of this solution, after the addition of 5 Cc. of ammonia water and 3 drops of potassium iodide T.S., should require for the production of a slight permanent precipitate, the addition of not less than 10 Cc. of tenth-normal silver nitrate V.S.

Average dose.— 0.1 Cc. (1½ minims).

ACIDUM HYPOPHOSPHOROSUM

Hypophosphorous Acid

A liquid composed of 30 percent., by weight, of absolute Hypophosphorous Acid [$PO.H_2(OH) = 65.53$], and 70 percent. of water. It should be kept in glass-stoppered bottles.

A colorless liquid, without odor, and having an acid taste.
Specific gravity: about 1.130 at 25° C. (77° F.).
Miscible, in all proportions, with water. Hypophosphorous Acid, even when largely diluted with water, has an acid reaction upon blue litmus paper.
When heated in a porcelain dish, water evaporates, and the acid becomes more concentrated. On further heating between 130° and 140° C. (266° and 284° F.), it decomposes, forming hydrogen phosphide, which ignites, and phosphorous acid; the latter between 160° and 170° C. (320° and 338° F.) decomposes into hydrogen phosphide and phosphoric acid; the pasty residue finally reddens, ignites, and the last portions of unoxidized phosphorus burn out at a higher temperature.
The addition of silver nitrate T.S. to Hypophosphorous Acid, diluted with an equal volume of water, produces a black precipitate of metallic silver; the addition of mercuric chloride T.S., a white precipitate of mercurous chloride.

When the acid is gently heated with copper sulphate T.S., a yellow precipitate, forms, which rapidly assumes a reddish-brown color.

If 10 Cc. of the Acid be neutralized with ammonia water, not more than a slight precipitate should result, and after filtering, the filtrate should not become turbid upon the addition of potassium sulphate T.S. (limit of *barium*).

Ten Cc. of the Acid should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Neither platinic chloride T.S. nor sodium cobaltic nitrite T.S. should produce more than a slight yellow turbidity in the diluted Acid (limit of *potassium*).

If 2 Cc. of Hypophosphorous Acid be measured into a beaker containing 3 Cc. of nitric acid, which has been previously diluted with about 10 Cc. of water, and the whole evaporated to dryness on a bath of boiling water, the residue should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 10 Gm. of Hypophosphorous Acid be diluted with distilled water to measure 100 Cc., then 65.5 Cc. of this solution should require 30 Cc. of normal potassium hydroxide V.S. for neutralization (each Cc. corresponding to 1 percent. of absolute Hypophosphorous Acid), methyl-orange T.S. being used as indicator.

ACIDUM HYPOPHOSPHOROSUM DILUTUM

Diluted Hypophosphorous Acid

A liquid composed of 10 percent., by weight, of absolute Hypophosphorous Acid [$PO.H_2(OH) = 65.53$], and 90 percent. of water.

Hypophosphorous Acid, *two hundred grammes*	200 Gm.
Distilled Water, *four hundred grammes*	400 Gm.
To make *six hundred grammes* . .	600 Gm.

Mix them. Keep the product in well-stoppered bottles.

Specific gravity: about 1.042 at 25° C. (77° F.).

It should respond to the reactions and tests given under *Acidum Hypophosphorosum*.

If 10 Gm. of Diluted Hypophosphorous Acid be diluted with distilled water to measure 100 Cc., then 65.5 Cc. of this solution should require 10 Cc. of normal potassium hydroxide V.S. for neutralization (each Cc. corresponding to 1 percent. of absolute Hypophosphorous Acid), methyl-orange T.S. being used as indicator.

Average dose.— 0.5 Cc. (8 minims).

ACIDUM LACTICUM

Lactic Acid

A liquid organic acid, composed of not less than 75 percent., by weight, of absolute Lactic Acid [$CH_3.CHOH.COOH = 89.37$], and about 25 percent. of water.

A colorless, syrupy liquid, odorless, of a purely acid taste, and absorbing moisture on exposure to damp air.

Specific gravity: about 1.206 at 25° C. (77° F.).

Freely miscible with water, alcohol, or ether; insoluble in chloroform, petroleum benzin, or carbon disulphide.

Lactic Acid is not vaporized by a heat below 160° C. (320° F.); at a higher temperature it emits inflammable vapors, and is finally dissipated; 5 Gm., after combustion, should not leave more than 0.05 Gm. of fixed residue.

Lactic Acid has an acid reaction upon blue litmus paper.

On adding some potassium permanganate to a mixture of equal volumes of Lactic and sulphuric acids, and gently heating, the odor of aldehyde will become perceptible.

Ten Cc. of a solution of the Acid in distilled water (1 in 100) should not be rendered opalescent by 1 Cc. of silver nitrate T.S. (limit of *chloride*).

Ten Cc. of an aqueous solution (1 in 20) should remain unaffected by the addition of 1 Cc. of barium chloride T.S. (absence of *sulphate*), or by 1 Cc. of copper sulphate T.S. (absence of *sarcolactic acid*), nor should it respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

On adding a few drops of Lactic Acid to 10 Cc. of hot alkaline cupric tartrate V.S., no red precipitate should be formed (absence of *sugars*).

On warming Lactic Acid, the odor of rancid fat should not be noticeable (absence of *butyric* and *other fatty acids*).

If a small portion of the Acid be heated on a water-bath with an excess of zinc carbonate, the mixture dried at 100° C. (212° F.), and then extracted with absolute alcohol, upon evaporation of the latter no sweet residue should remain (absence of *glycerin*).

On carefully pouring Lactic Acid upon an equal volume of colorless, concentrated sulphuric acid contained in a clean test-tube, and keeping the temperature at or below 15° C. (59° F.), no dark-colored zone should develop at the line of contact upon standing for fifteen minutes (absence of more than traces of *organic impurities*).

If 5 Gm. of Lactic Acid be diluted with water to measure 50 Cc., then 44.7 Cc. of this solution should require for complete neutralization at boiling temperature not less than 37.5 Cc. of normal potassium hydroxide V.S. (each Cc. corresponding to 2 percent. of absolute Lactic Acid), phenolphthalein T.S. being used as indicator.

Average dose.—2 Cc. (30 minims).

ACIDUM NITRICUM

Nitric Acid

A liquid composed of 68 percent., by weight, of absolute Nitric Acid [HNO_3 or $NO_2.OH = 62.57$], and 32 percent. of water. It should be kept in glass-stoppered bottles.

A colorless, fuming liquid, very caustic and corrosive, and having a peculiar, somewhat suffocating odor.

Specific gravity: about 1.403 at 25° C. (77° F.).

It boils and is completely volatilized at 120.5° C. (248.9° F.).

It dissolves copper, mercury, silver, and other metals with evolution of red fumes, and stains woollen fabrics and animal tissues a bright yellow.

Heated with indigo T.S., it discharges the blue color of the reagent.

Even when highly diluted, it shows an acid reaction upon blue litmus paper.

If 10 Cc. of the Acid be evaporated to dryness and further heated to 110° C. (230° F.), no appreciable residue should remain (limit of *non-volatile impurities*).

Five Cc. of diluted Nitric Acid (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Other portions of this dilution should not yield a precipitate upon the addition of barium chloride T.S. (absence of *sulphuric acid*); or of silver nitrate T.S. (absence of *hydrochloric acid*).

Nitric Acid when neutralized with ammonia water and diluted with distilled water (1 in 20) should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If the diluted Acid (1 in 3) be shaken with a few drops of chloroform, the latter should remain colorless (absence of *iodine* or *bromine*), even after the introduction of a small piece of metallic tin (absence of *iodic* or *bromic acid*).

Introduce into a stoppered weighing-bottle 3 Cc. of Nitric Acid and weigh accurately. Dilute the Acid with 50 Cc. of distilled water and titrate with normal potassium hydroxide V.S., using methyl-orange T.S. as indicator. Multiply the number of Cc. of the normal potassium hydroxide V.S. consumed, by 6.257, and divide this product by the weight of the Acid taken; the quotient represents the percentage of absolute Nitric Acid in the latter.

ACIDUM NITRICUM DILUTUM

Diluted Nitric Acid

Diluted Nitric Acid should contain 10 percent., by weight, of absolute Nitric Acid [HNO_3 or $NO_2.OH = 62.57$], and 90 percent. of water.

Nitric Acid, *one hundred grammes*	100 Gm.
Distilled Water, *five hundred and eighty grammes*	580 Gm.
To make *six hundred and eighty grammes* . .	680 Gm.

Mix them. Keep the product in dark amber-colored, glass-stoppered bottles.

Specific gravity: about 1.054 at 25° C. (77° F.).

It should respond to the reactions and tests given under *Acidum Nitricum*.

To neutralize 6.26 Gm. (6.257 Gm.) of Diluted Nitric Acid should require 10 Cc. of normal potassium hydroxide V.S. (each Cc. corresponding to 1 percent. of absolute Nitric Acid), methyl-orange T.S. being used as indicator.

Average dose.— 2 Cc. (30 minims).

ACIDUM NITROHYDROCHLORICUM

Nitrohydrochloric Acid

Nitric Acid, *one hundred and eighty cubic centimeters*	180 Cc.
Hydrochloric Acid, *eight hundred and twenty cubic centimeters*	820 Cc.
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix the Acids in a capacious glass vessel, and, when effervescence has ceased, pour the product into dark amber-colored, glass-stoppered bottles, which should not be more than half filled, and which should be kept in a cool place.

A golden-yellow, fuming, and very corrosive liquid, having a strong odor of chlorine. Completely volatilized by heat. It readily dissolves gold leaf, and a drop of it, when added to potassium iodide T.S., liberates iodine.

dose.— 0.2 Cc. (3 minims).

ACIDUM NITROHYDROCHLORICUM DILUTUM

Diluted Nitrohydrochloric Acid

Nitric Acid, *forty cubic centimeters*	40 Cc.
Hydrochloric Acid, *one hundred and eighty-two cubic centimeters*	182 Cc.
Distilled Water, *seven hundred and seventy-eight cubic centimeters*	778 Cc.
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix the Acids in a capacious glass vessel, and, when effervescence has ceased, add the Distilled Water. Diluted Nitrohydrochloric Acid should be kept in dark amber-colored, glass-stoppered bottles, in a cool place. It should not be dispensed unless recently prepared.

A colorless or pale yellowish liquid, having a faint odor of chlorine, and a very acid taste. It is completely volatilized by heat. When it is added to potassium iodide T.S., iodine is liberated.

Average dose.—1 Cc. (15 minims).

ACIDUM OLEICUM

Oleic Acid

$HC_{18}H_{33}O_2 = 280.14$

A monobasic organic acid, prepared in a sufficiently pure condition by cooling commercial Oleic Acid to about 5° C. (41° F.), then separating and preserving the liquid portion.

A yellowish or brownish-yellow, oily liquid, having a peculiar, lard-like odor and taste; becoming darker and absorbing oxygen on exposure to air.

Specific gravity: about 0.895 at 25° C. (77° F.).

Insoluble in water; soluble in alcohol, chloroform, benzene, petroleum benzin, and fixed and volatile oils.

When cooled to from 9° to 4° C. (48.2° to 39.2° F.), Oleic Acid becomes semi-solid, and on further cooling, congeals to a whitish, solid mass.

When heated to a temperature of about 95° C. (203° F.), decomposition commences, and acrid vapors are produced. At a higher temperature it is completely dissipated.

An alcoholic solution of Oleic Acid has a feebly acid reaction upon blue litmus paper.

Equal volumes of Oleic Acid and alcohol, mixed at 25° C. (77° F.), should yield a clear solution without the separation of any oily drops (*absence of fixed oils*).

If 1 Gm. of Oleic Acid be heated with 20 Cc. of alcohol, and 2 drops of phenolphthalein T.S. be added, followed by a strong solution of sodium hydroxide (1 in 4), drop by drop, until the liquid has acquired a permanent red tint and the Acid is saponified, and if acetic acid be added until the red color of the liquid is just discharged, and the liquid be filtered, then 10 Cc. of the filtrate mixed with 10 Cc. of ether should not be rendered more than slightly turbid by shaking with 1 Cc. of lead acetate T.S. (*absence of notable quantities of palmitic and stearic acids*).

ACIDUM PHOSPHORICUM

Phosphoric Acid

A liquid composed of 85 percent., by weight, of absolute Orthophosphoric Acid [H_3PO_4 or $PO(OH)_3 = 97.29$], and 15 percent. of water. It should be kept in glass-stoppered bottles.

A colorless liquid of a syrupy consistence, without odor, and having a strongly acid taste. Specific gravity: about 1.707 at 25° C. (77° F.).

Miscible, in all proportions, with water or alcohol.

When heated, the liquid loses water; at 200° C. (392° F.), it gradually begins to change to pyrophosphoric acid. At a still higher temperature it is converted into metaphosphoric acid, which volatilizes in dense fumes, or, on cooling, forms a transparent mass of glacial phosphoric acid.

It has an acid reaction upon blue litmus paper even when largely diluted.

If a small portion of Phosphoric Acid be supersaturated with ammonia water, the addition of magnesium sulphate T.S. (or of magnesia mixture) produces a white, crystalline precipitate. If this precipitate be collected, washed, and dissolved in diluted acetic acid, the solution yields a yellow precipitate with silver nitrate T.S. (distinction from *metaphosphoric* or *pyrophosphoric acid*).

If a crystal of ferrous sulphate be dropped into a cooled mixture of 1 Cc., each, of Phosphoric Acid, sulphuric acid, and water, no brown or brownish-black color should appear around the crystal (absence of *nitric acid*).

If 1 Cc. of Phosphoric Acid be diluted with 5 Cc. of water, and the liquid gently warmed, it should not be blackened upon the addition of a few drops of silver nitrate T.S., or rendered turbid by mercuric chloride T.S. (absence of *phosphorous acid*).

If Phosphoric Acid be diluted with water (1 in 10), 5 Cc. should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Upon adding to 1 Cc. of Phosphoric Acid a mixture of 3 Cc. of alcohol and 1 Cc. of ether, no turbidity should appear (absence of *phosphates*).

If Phosphoric Acid be diluted with water (1 in 20), 10 Cc. should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

After diluting a portion of the Acid with 5 volumes of water, no precipitate should be produced, in separate portions of the liquid, by silver nitrate T.S. (absence of *hydrochloric acid*); or when dropped into albumin T.S. (absence of *metaphosphoric acid*); nor should any precipitate be formed, even after several hours, by the addition of an equal volume of official tincture of ferric chloride (absence of *pyrophosphoric* and *metaphosphoric acids*). If 0.1 Cc. of the Acid be diluted with water to 7 Cc. and 1 Cc. of barium chloride T.S. be added, no cloudiness or precipitate should appear within 30 seconds (limit of *sulphuric acid*).

If 10 Gm. of Phosphoric Acid be diluted to measure 100 Cc., then 9.73 Cc. of this solution, when diluted with a cold saturated aqueous solution containing 5 Gm. of sodium chloride, should require 17 Cc. of normal potassium hydroxide V.S. for neutralization (each Cc. corresponding to 5 percent. of absolute Phosphoric Acid), phenolphthalein T.S. being used as indicator.

ACIDUM PHOSPHORICUM DILUTUM

Diluted Phosphoric Acid

Diluted Phosphoric Acid should contain 10 percent., by weight, of absolute Orthophosphoric Acid [H_3PO_4 or $PO(OH)_3 = 97.29$], and 90 percent. of water.

Phosphoric Acid, *one hundred grammes*	100 Gm.
Distilled Water, *seven hundred and fifty grammes*	750 Gm.
To make *eight hundred and fifty grammes* . .	850 Gm.

Mix them. Keep the product in glass-stoppered bottles.

Specific gravity: about 1.057 at 25° C. (77° F.).

It corresponds in chemical properties and should conform to the reactions and tests given under *Acidum Phosphoricum*.

If 4.87 Gm. of Diluted Phosphoric Acid be diluted with 5 Cc. of a cold saturated solution of sodium chloride, it should require 10 Cc. of normal potassium hydroxide V.S. for neutralization (each Cc. corresponding to 1 percent. of absolute Phosphoric Acid), phenolphthalein T.S. being used as indicator.

Average dose.—2 Cc. (30 minims).

ACIDUM SALICYLICUM

Salicylic Acid

$HC_7H_5O_3 = 137.01$

A monobasic organic acid [$C_6H_4(OH)COOH\,1{:}2$], existing naturally in combination in various plants, but generally prepared synthetically from phenol.

Light, fine, white, prismatic needles, or a bulky, white, crystalline powder; odorless, or having a slight gaultheria-like odor, with a sweetish, afterwards acrid taste, and permanent in the air.

Soluble in 308 parts of water and in 2 parts of alcohol at 25° C. (77° F.); in 14 parts of boiling water, and very soluble in boiling alcohol; also soluble in ether, absolute alcohol, and chloroform.

When heated to 156° C. (312.8° F.), the Acid begins to melt, and is completely melted at 157° C. (314.6° F.); at a higher temperature it is gradually dissipated without leaving more than 0.6 percent. of fixed residue.

The saturated aqueous solution has an acid reaction upon blue litmus paper, and is colored intensely bluish-violet (in high dilution violet-red) by ferric chloride T.S.

On adding to a small portion of Salicylic Acid, in a test-tube, about 1 Cc. of concentrated sulphuric acid, then, cautiously, about 1 Cc. of methyl alcohol in drops, and heating the mixture to boiling, methyl salicylate will be produced, which may be recognized by its odor.

On allowing a saturated alcoholic solution of the Acid to evaporate spontaneously in a glass or porcelain evaporating dish, in a place protected from dust, a perfectly white, crystalline residue should remain (absence of *iron, phenol,* or *coloring matter*).

If 1 Gm. of the Acid be dissolved in an excess of cold sodium carbonate T.S., the liquid agitated with an equal volume of ether, and the ethereal solution allowed to evaporate spontaneously, the residue, if any, should be free from the odor of *phenol*.

On treating about 0.5 Gm. of Salicylic Acid, in a clean test-tube, with 10 Cc. of concentrated sulphuric acid, no color should be imparted to the latter within fifteen minutes (absence of *readily carbonizable, organic impurities*).

A solution of 0.5 Gm. of the Acid in 10 Cc. of alcohol, mixed with a few drops of nitric acid, should remain unaffected upon the addition of a few drops of silver nitrate T.S. (absence of *hydrochloric acid*).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

ACIDUM STEARICUM

Stearic Acid

$HC_{18}H_{35}O_2 = 282.14$

A monobasic organic acid [$C_{17}H_{35}.COOH$], in its commercial, more or less impure form, usually obtained from the more solid fats, chiefly tallow.

A hard, white, somewhat glossy solid, odorless and tasteless, and permanent in the air.

Insoluble in water; soluble in about 16.6 parts of alcohol at 25° C. (77° F.); readily soluble in boiling alcohol, and in ether.

Stearic Acid, when pure, melts at 69.2° C. (156.6° F.). The commercial Acid should have a melting point not lower than 56° C. (132.8° F.), and the melted Acid should become opaque and begin to congeal at a temperature not lower than 54° C. (129.2° F.).

If 1 Gm. of Stearic Acid and 0.5 Gm. of monohydrated sodium carbonate be boiled with 30 Cc. of water, in a capacious flask, the resulting solution, while hot, should not be more than opalescent (limit of *undecomposed fat*).

ACIDUM SULPHURICUM

Sulphuric Acid

A liquid composed of not less than 92.5 percent., by weight, of absolute Sulphuric Acid [H_2SO_4 or $SO_2(OH)_2 = 97.35$], and about 7.5 percent. of water. It should be kept in glass-stoppered bottles.

A colorless liquid, of oily consistence, inodorous, and very caustic and corrosive.

Specific gravity: not below 1.826 at 25° C. (77° F.).

Miscible, in all proportions, with water or alcohol, with evolution of much heat; the Acid should be added with great caution to the diluent.

It boils at 338° C. (640.4° F.). When heated on platinum foil, it is vaporized, with the evolution of dense fumes, without leaving a residue.

Sulphuric Acid, even when highly diluted, shows an acid reaction upon blue litmus paper.

If Sulphuric Acid be dropped upon cane-sugar or wood, it chars them.

Diluted with 20 volumes of water, it yields with barium chloride T.S. a copious white precipitate, insoluble in hydrochloric acid.

On mixing the Acid carefully with 4 or 5 volumes of alcohol, no precipitate should be formed within one hour (absence of *lead*).

If there be carefully poured upon it, in a test-tube, a layer of ferrous sulphate T.S., and the liquid cooled, the zone of contact should not assume a brown or reddish color (limit of *nitric* or *nitrous acid*).

Sulphuric Acid, diluted with 20 volumes of water, should yield no precipitate upon the addition of silver nitrate T.S. (absence of *hydrochloric acid*); nor should the solution respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121); nor, upon supersaturating with ammonia water, should the solution leave any appreciable fixed residue on evaporation and ignition (absence of *non-volatile impurities*).

One Cc. of Sulphuric Acid, diluted with 5 Cc. of water and cooled, should not at once discharge the color of 0.1 Cc. of tenth-normal potassium permanganate V.S. (limit of *sulphurous* or *nitrous acid*).

If Sulphuric Acid be diluted with water (1 in 10), 5 Cc. should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 2 Cc. of hydrochloric acid in which a fragment of sodium sulphite has been dissolved be carefully poured upon 2 Cc. of Sulphuric Acid contained in a test-tube, the zone of contact should not assume a pink or red color upon standing, nor should a precipitate form after heating (limit of *selenium*).

Introduce into a stoppered weighing-bottle 3 Cc. of Sulphuric Acid and weigh accurately. Dilute the acid with 50 Cc. of distilled water and titrate with normal potassium hydroxide V.S., using methyl-orange T.S. as indicator. Multiply the number of Cc. of the normal potassium hydroxide V.S. consumed, by 4.8675, and divide this product by the weight of the Acid taken; the quotient represents the percentage of absolute Sulphuric Acid in the latter.

ACIDUM SULPHURICUM AROMATICUM

Aromatic Sulphuric Acid

Aromatic Sulphuric Acid should contain not less than 20 percent., by weight, of absolute Sulphuric Acid [H_2SO_4 or $SO_2(OH)_2 = 97.35$], partly in the form of ethyl-sulphuric acid.

Sulphuric Acid, *one hundred and eleven cubic centimeters* . . .	111 Cc.
Tincture of Ginger, *fifty cubic centimeters*	50 Cc.
Oil of Cinnamon, *one cubic centimeter*	1 Cc.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Add the Sulphuric Acid gradually, and with great caution, to *seven hundred cubic centimeters* of Alcohol, and allow the mixture to cool. Then add to it the Tincture of Ginger and the Oil of Cinnamon, and afterwards enough Alcohol to make the whole measure *one thousand cubic centimeters*. Keep the product in glass-stoppered bottles.

Specific gravity: about 0.933 at 25° C. (77° F.).

If 10 Gm. of Aromatic Sulphuric Acid be mixed in a small flask with 30 Cc. of water and be boiled for four hours, cooled and diluted with water to measure 100 Cc., then 48.68 Cc. of this solution, to which exactly 25 Cc. of normal potassium hydroxide V.S. have been added, should require not more than 5 Cc. of normal sulphuric acid V.S. for complete neutralization (each Cc. of the normal potassium hydroxide V.S. consumed corresponding to 1 percent. of absolute Sulphuric Acid), methyl-orange T.S. being used as indicator.

Average dose.—1 Cc. (15 minims).

ACIDUM SULPHURICUM DILUTUM

Diluted Sulphuric Acid

Diluted Sulphuric Acid should contain not less than 10 percent., by weight, of absolute Sulphuric Acid [H_2SO_4 or $SO_2(OH)_2 = 97.35$], and about 90 percent. of water.

Sulphuric Acid, *one hundred grammes*	100 Gm.
Distilled Water, *eight hundred and twenty-five grammes*	825 Gm.
To make *nine hundred and twenty-five grammes* . . .	925 Gm.

Pour the Acid gradually, with constant stirring, into the Distilled Water. Keep the product in glass-stoppered bottles.

Specific gravity: about 1.067 at 25° C. (77° F.).

It should respond to the reactions and tests given under *Acidum Sulphuricum*.

To neutralize 4.868 Gm. of Diluted Sulphuric Acid not less than 10 Cc. of normal potassium hydroxide V.S. should be required (each Cc. corresponding to 1 percent. of absolute Sulphuric Acid), methyl-orange T.S. being used as indicator.

Average dose.—2 Cc. (30 minims).

ACIDUM SULPHUROSUM

Sulphurous Acid

An aqueous solution containing not less than 6 percent., by weight, of sulphur dioxide [$SO_2 = 63.59$], and about 94 percent. of water.

Sulphuric Acid, *sixty cubic centimeters*	60 Cc.
Charcoal, in coarse powder, *twenty grammes*	20 Gm.
Distilled Water, *five hundred cubic centimeters*	500 Cc.

Introduce the Charcoal into a glass flask having a capacity of about five hundred cubic centimeters, add the Acid, and mix them well. Connect the flask by means of bent glass tubing, about fifty centimeters in length, with a wash-bottle having a capacity of about two hundred cubic centimeters, containing about *fifty cubic centimeters* of water, so that the end of the inlet tube shall be below the surface of the water. Through the triply perforated rubber stopper of the wash-bottle pass a safety tube, which should reach nearly to the bottom of the bottle, and connect the latter, by means of glass tubing, with a bottle provided with a doubly perforated rubber stopper, having a capacity of about one thousand cubic centimeters, and containing *five hundred cubic centimeters* of well-cooled Distilled Water. The inlet tube should dip about twenty-five millimeters below the surface of the Distilled Water. By means of a second tube connect this bottle with another containing water, the end of the tube extending five centimeters below the surface. Having ascertained that all the connections are air-tight, apply a moderate heat to the flask containing the Sulphuric Acid and Charcoal, until the evolution of gas has nearly ceased, and, during the passage of the gas, keep the bottle containing the Distilled Water at or below 10° C. (50° F.), by surrounding it with cold water or ice. Assay a small portion of the Sulphurous Acid by the method given below. Then add to the remainder sufficient Distilled Water to bring the product to the strength of 6.4 percent., by weight, of sulphur dioxide. Finally pour the Sulphurous Acid into dark amber-colored, glass-stoppered bottles, which should be completely filled, and kept in a cool place, protected from light.

Owing to its rapid deterioration, Sulphurous Acid should be frequently assayed, and none should be dispensed, if it fails to conform to the assay given below.

A colorless liquid, having the characteristic odor of burning sulphur, and an acid, sulphurous taste.

Specific gravity: not less than 1.028 at 25° C. (77° F.).

By heat it is completely volatilized. Blue litmus paper moistened with the Acid is first reddened and afterwards bleached.

On gently heating a few Cc. of the Acid in a test-tube, the gas evolved will blacken a strip of paper moistened with mercurous nitrate T.S., but will not affect one moistened with lead acetate T.S.

On mixing, in a test-tube, 1 Cc. of Sulphurous Acid with 5 Cc. of diluted hydrochloric acid, and adding a small piece of pure zinc, hydrogen sulphide gas will be evolved, which will blacken a strip of paper moistened with lead acetate T.S.

If 1 Cc. of Sulphurous Acid be diluted with 99 Cc. of water and there be added 1 Cc. of diluted hydrochloric acid, and afterwards 1 Cc. of barium chloride T.S., not more than a slight turbidity should be at once produced (limit of *sulphuric acid*).

Assay of Sulphurous Acid

Introduce into a stoppered weighing-bottle 2 Cc. of Sulphurous Acid and weigh accurately. To this add 50 Cc. of tenth-normal iodine V.S., and allow it to stand for five minutes, then slowly add tenth-normal sodium thiosulphate V.S. until the mixture is just decolorized. Subtract the number of cubic centimeters of the tenth-normal sodium thiosulphate V.S. used, from 50, and multiply the difference by 0.318, and divide this product by the weight of the Acid taken; the quotient represents the percentage of absolute Sulphurous Acid in the latter. Dilute the Sulphurous Acid with distilled water, as directed in the process above, so that it shall have the strength of 6.4 percent. of sulphur dioxide.

Average dose.— 2 Cc. (30 minims).

ACIDUM TANNICUM

Tannic Acid

$HC_{14}H_9O_9 = 319.66$

A monobasic organic acid [$C_{13}H_9O_7 . COOH$], obtained from nutgall.

A light yellowish, amorphous powder, gradually turning darker when exposed to air and light, usually cohering in the form of glistening scales or spongy masses, odorless, or having a faint, characteristic odor, and a strongly astringent taste.

Very soluble in water and alcohol at 25° C. (77° F.), and in boiling water and boiling alcohol; also in about 1 part of glycerin, with the application of a moderate heat; freely soluble in diluted alcohol, sparingly in absolute alcohol; almost insoluble in absolute ether, chloroform, benzene, or petroleum benzin.

When heated on platinum foil, the Acid is gradually consumed, leaving not more than 0.6 percent. of ash.

An aqueous solution of Tannic Acid reddens blue litmus paper.

The addition of a small quantity of ferric chloride T.S. to an aqueous solution of the Acid produces a bluish-black color or precipitate.

On adding to an aqueous solution (1 in 100) of Tannic Acid a small quantity of calcium hydroxide T.S., a pale bluish-white, flocculent precipitate is produced which is not dissolved on shaking (difference from *gallic acid*), and which becomes more copious and of a deeper blue by the addition of a moderate excess of calcium hydroxide T.S., while a large excess of the latter imparts a pale pinkish tint to the solution.

The aqueous solution of the Acid produces precipitates with most alkaloids and glucosides, and with test solutions of gelatin, albumin, and starch (distinction from *gallic acid*).

If 2 Gm. of Tannic Acid be dissolved in 10 Cc. of boiling water, and the liquid allowed to cool, no turbidity should be produced on diluting 5 Cc. of the solution with 10 Cc. of alcohol (absence of *gum* or *dextrin*), or with 10 Cc. of water (absence of *resinous substances*).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

ACIDUM TARTARICUM

Tartaric Acid

$H_2C_4H_4O_6 = 148.92$

A dibasic organic acid [$C_2H_2(OH)_2(COOH)_2$], usually prepared from argol. It should contain not less than 99.5 percent. of pure Tartaric Acid.

Colorless, translucent, monoclinic prisms, or crystalline crusts, or a white powder, odorless, having a purely acid taste, and permanent in the air.

Soluble in 0.71 part of water, and in 1.67 parts of alcohol at 25° C. (77° F); in about 0.5 part of boiling water, and in about 0.2 part of boiling alcohol; also in 250 parts of ether; nearly insoluble in chloroform, benzene, or petroleum benzin.

When heated for some time at 100° C. (212° F.), the powdered crystals do not suffer a sensible loss of weight. From 168° to 170° C. (334.4° to 338° F.), the Acid melts. At a higher temperature it is gradually decomposed, emitting an odor resembling burning sugar, and is finally consumed, leaving not more than 0.05 percent. of ash. An aqueous solution of Tartaric Acid reddens blue litmus paper. An aqueous solution (1 in 2) of the Acid mixed with a strong solution (1 in 3) of potassium acetate yields a white crystalline precipitate, which is soluble in solutions of alkalies and in mineral acids, but insoluble in acetic acid.

The aqueous solution (1 in 10) of the Acid, acidulated with a few drops of hydrochloric acid, should show but a faint turbidity by barium chloride T.S. (limit of *sulphuric acid*).

An aqueous solution (1 in 10) in which the free Acid has been nearly but not entirely neutralized by ammonia water, should not be affected by calcium sulphate T.S. (absence of, and difference from, *oxalic acid*).

On supersaturating 10 Cc. of the aqueous solution (1 in 10) with ammonia water, no more than a faint turbidity should be produced in the liquid by ammonium oxalate T.S. (absence of more than a trace of *calcium*), nor should the aqueous solution (1 in 20) mixed with a few drops of hydrochloric acid show any color in the acid solution when submitted to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121), omitting the subsequent addition of ammonia water.

To neutralize 3.73 Gm. (3.723) of Tartaric Acid should require not less than 49.8 Cc. of normal potassium hydroxide V.S. (each Cc. corresponding to 2 percent. of pure Tartaric Acid), phenolphthalein T.S. being used as indicator.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

ACIDUM TRICHLORACETICUM

Trichloracetic Acid

$HC_2Cl_3O_2 = 162.12$

A monobasic organic acid [$CCl_3.COOH$], usually obtained by the oxidation of hydrated chloral with nitric acid. It should be kept in dark amber-colored, well-stoppered bottles in a cool place.

White, deliquescent, rhombohedral crystals, having a slight characteristic odor.

Very soluble in water, alcohol, and ether. The aqueous solution, on boiling, is decomposed with the formation of chloroform and carbon dioxide.

Heated to 52° C. (125.6° F.) it melts, and at 195° C. (383° F.) it boils and vaporizes without leaving a residue.

An aqueous solution of Trichloracetic Acid has an acid reaction upon blue litmus paper.

On heating with potassium hydroxide T.S., it is decomposed with the formation of chloroform and potassium carbonate.

If to its aqueous solution (1 in 10) ferric chloride T.S. be added, a faint reddish color is developed.

One Gm. when diluted with 50 Cc. of water should not require less than 6.1 Cc. of normal sodium hydroxide V.S. for neutralization, phenolphthalein T.S. being used as indicator.

ACONITINA

Aconitine

$C_{34}H_{47}NO_{11} = 640.55$

An alkaloid obtained from Aconite. It should be kept in amber-colored, well-stoppered vials.

Colorless or white rhombic tables or prisms, possessing no odor, permanent in the air, and producing, in extremely diluted solutions, a characteristic tingling sensation when brought in contact with the mucous surfaces of the tongue or lips. *The alkaloid itself should never be tasted, and its solutions only when largely diluted, and then with the utmost caution.*

Soluble in 3200 parts of water, 22 parts of alcohol, 44 parts of ether, 5.6 parts of benzene, and 3580 parts of petroleum benzin, at 25° C. (77° F.); also very soluble in chloroform.

When heated rapidly, Aconitine melts at 195° C. (383° F.); when heated slowly, decomposition takes place, and it melts at 182° C. (359.6° F.). Upon ignition, it is consumed without leaving a residue.

Aconitine solutions have an alkaline reaction upon litmus, and are lævogyrate.

Aconitine, when dropped upon sulphuric or nitric acids, should produce no color, but if rubbed with sulphuric acid containing a crystal of ammonium vanadate, an orange color is produced.

Dilute solutions of Aconitine yield precipitates with mercuric potassium iodide T.S., tannic acid T.S., and gold chloride T.S., but only concentrated solutions yield precipitates with platinic chloride T.S., mercuric chloride T.S., and picric acid T.S.

On evaporating 0.01 Gm. of Aconitine with 5 drops of fuming nitric acid, the resulting yellow residue, when cooled, should not yield a violet color when treated with alcoholic potassium hydroxide T.S. (difference from *pseudaconitine* and *atropine*).

Any soluble salt of Aconitine in dilutions of 1 in 1000 produces, with a drop of potassium permanganate T.S., a blood-red precipitate of aconitine permanganate. Aconitine containing decomposition products (amorphous Aconitine) produces this precipitate only in solutions containing not less than 1 in 200. (Cocaine, hydrastine, and papaverine also yield similar precipitates, but only when in more concentrated solutions).

Average dose.— 0.00015 Gm. = 0.15 milligramme ($\frac{1}{400}$ grain).

ACONITUM

Aconite

The dried tuberous root of *Aconitum Napellus* Linné (Fam. *Ranunculaceæ*), collected in autumn; yielding, when assayed by the process given below, not less than 0.5 percent. of aconitine.

Slenderly conical, 4 to 10 Cm. long, 10 to 20 Mm. thick at the crown; occasionally split; longitudinally wrinkled; dark brown and marked with coarse whitish root-scars; fracture short, horny or mealy; internally whitish or light brown; the cambium zone irregular and 5- to 7-angled; odor very slight; taste sweetish, soon becoming acrid and developing a tingling sensation, followed by numbness.

Assay of Aconite

Aconite, in No. 40 powder, *ten grammes* . . . . **10 Gm.**
Alcohol,
Distilled Water,
Ether,
Ammonia Water,
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Cochineal T.S., each, *a sufficient quantity.*

Introduce the Aconite into a 200 Cc. Erlenmeyer flask, add 75 Cc. of a mixture of alcohol, 7 parts, and distilled water, 3 parts (by volume), stopper the flask securely, and agitate it at intervals during four hours. After placing a pledget of cotton in the bottom of a small cylindrical glass percolator (25 Mm. in diameter), carefully transfer the contents of the flask to the percolator. When the liquid has all passed through, continue the percolation with more of the same mixture until 150 Cc. of percolate have been obtained. Pour the percolate into a shallow porcelain evaporating dish, and evaporate it to dryness at a temperature not exceeding 60° C. (140° F.). Add 5 Cc. of tenth-normal sulphuric acid V.S., and 25 Cc. of distilled water. When the extract is dissolved, filter the liquid into a separator, washing the dish and filter with about 25 Cc. of distilled water, and add the washings to the separator. Add 25 Cc. of ether and 2 Cc. of ammonia water to the separator, and agitate it for one minute. Draw off the lower layer into a flask, and filter the ether-solution into a beaker. Return the contents of the flask to the separator, add 15 Cc. of ether, and again agitate it for one minute. Draw off the lower layer into the flask, and filter the ether-solution into the beaker. Repeat the shaking out with two other portions of 10 Cc. each of ether. Evaporate the combined ether-solutions to dryness, and dissolve the residue in 3 Cc. of tenth-normal sulphuric acid V.S. Add to the solution 5 drops of cochineal T.S., and then carefully run in fiftieth-normal potassium hydroxide V.S. until a pink color is produced. Divide the number of Cc. of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract this number from 3 (the 3 Cc. of tenth-normal sulphuric acid V.S. taken), multiply the remainder by 0.064, and this product by 10, which will give the percentage of aconitine in the Aconite.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

ADEPS

Lard

The prepared internal fat of the abdomen of the hog (*Sus scrofa*, var. *domesticus* Gray), purified by washing, melting, and straining. It should be kept in well-closed vessels impervious to fat, in a cool place.

A soft, white, unctuous solid, having a faint odor free from rancidity, and a bland taste.

Insoluble in water; very slightly soluble in alcohol; readily soluble in ether, chloroform, carbon disulphide, or petroleum benzin.

Specific gravity: about 0.917 at 25° C. (77° F.), and about 0.904 at 40° C. (104° F.), water at 25° C. (77°F.) taken as the standard.

It melts at 38° to 40° C. (100.4° to 104° F.) to a perfectly clear liquid, which is colorless in thin layers and from which an aqueous layer should not separate.

Distilled water boiled with Lard should not acquire an alkaline reaction (absence of *alkalies*). A portion of the water, when filtered, acidulated with nitric acid and treated with silver nitrate T.S., should not yield a white precipitate soluble in ammonia water (absence of *chlorides*).

If 10 Gm. of Lard be dissolved in chloroform, and the solution mixed with 10 Cc. of alcohol and 1 drop of phenolphthalein T.S., it should not require more than 0.2 Cc. of normal potassium hydroxide V.S. to produce a pink tint after strongly shaking (limit of *free fatty acids*).

If 5 Cc. of melted and filtered Lard be, while warm, intimately mixed by agitation in a test-tube with 5 Cc. of an alcoholic solution of silver nitrate (made by dissolving 0.1 Gm. of silver nitrate in 10 Cc. of alcohol, and adding 2 drops of nitric acid), and the mixture then heated for five minutes in a water-bath, the liquid fat should not acquire a reddish or brown color, nor should any dark color be produced at the line of contact of the hot liquids (absence of more than about 5 percent. of *cotton seed fats*).

If 2 Cc. of the melted and filtered Lard be mixed in a test-tube with 2 Cc. of equal volumes of amyl alcohol and carbon disulphide containing 1 percent. of sulphur in solution, and the test-tube be immersed to one-third or one-half its depth in boiling salt water, no reddish color should develop in from ten to fifteen minutes (absence of *cotton seed oil* or of *certain other fats*).

ADEPS BENZOINATUS

Benzoinated Lard

Lard, *one thousand grammes*	**1000 Gm.**
Benzoin, in coarse powder, *twenty grammes*	**20 Gm.**

Add the Benzoin to the Lard and mix thoroughly; then melt the Lard by means of a water-bath, and, stirring frequently, continue the heat for two hours, covering the vessel and not allowing the temperature to rise above 60° C. (140° F.). Lastly, strain the liquid through muslin and stir occasionally while it cools.

When Benzoinated Lard is to be kept or used during warm weather, 5 percent. (or more, if necessary) of the Lard should be replaced by White Wax.

ADEPS LANÆ

Wool-Fat

The purified fat of the wool of sheep (*Ovis aries* Linné), freed from water.

A light yellowish, tenacious, unctuous mass, having a slight, peculiar odor.

Insoluble in, but miscible with, large quantities of water, sparingly soluble in cold alcohol, more soluble in hot alcohol, readily soluble in ether and chloroform.

Wool-Fat melts at about 40° C. (104° F.), and at a higher temperature vaporizes, the vapor igniting and burning with a luminous, sooty flame.

The solution of Wool-Fat in chloroform (1 in 50), when poured upon the surface of concentrated sulphuric acid, gradually develops a deep brownish-red color at the line of contact of the layers.

When Wool-Fat is incinerated it should leave not more than 0.3 percent. of ash, which should not show an alkaline reaction to litmus paper (freedom from *alkalies*).

If 2 Gm. of Wool-Fat be dissolved in 10 Cc. of ether, and 2 drops of phenolphthalein T.S. added, a colorless liquid should be obtained (absence of *free alkalies*), which, on the addition of 1 drop of normal potassium hydroxide V.S., should develop a deep red color (absence of *free fatty acids*).

If 1 Gm. of Wool-Fat be boiled with 20 Cc. of alcohol, and the solution filtered after cooling, the filtrate should not be rendered turbid by the addition of an alcoholic solution of silver nitrate (1 in 20) (absence of *chlorides*).

If 10 Gm. of Wool-Fat be heated with 50 Cc. of water on a bath of boiling water until completely fused, the lower aqueous layer, when filtered through a well-wetted filter, should not yield *glycerin* on evaporation, and when boiled with potassium hydroxide T.S. it should not give off vapors of ammonia (absence of *organic nitrogenous matter*).

ADEPS LANÆ HYDROSUS

Hydrous Wool-Fat

The purified fat of the wool of sheep (*Ovis aries* Linné), mixed with not more than 30 percent. of water.

A yellowish-white, or nearly white, ointment-like mass, having a slight, peculiar odor.

Insoluble in water, but miscible with twice its weight of the latter, without losing its ointment-like character. With ether or chloroform it yields turbid solutions which are neutral to moistened litmus paper.

Hydrous Wool-Fat melts at about 40° C. (104° F.), and separates into an upper oily and a lower aqueous layer. When heated on a water-bath, with stirring until it ceases to lose weight, there should remain not less than 70 percent. of a residue, which is transparent when melted, and when cold remains as a yellowish, tenacious, unctuous mass, completely soluble in ether or chloroform, and only sparingly soluble in alcohol. If Hydrous Wool-Fat be thus deprived of water, it should respond to the tests given under *Adeps Lanæ*.

ÆTHER

Ether

A liquid composed of about 96 percent., by weight, of absolute Ether or Ethyl Oxide [$(C_2H_5)_2O = 73.52$], and about 4 percent. of alcohol containing a little water. Ether should be kept in partially filled, well-stoppered containers, preferably tin cans, in a cool place, remote from lights or fire.

A transparent, colorless, mobile liquid, having a characteristic odor, and a burning and sweetish taste.

Specific gravity: 0.716 to 0.717 at 25° C. (77° F.).

Soluble in about 10 times its volume of water at 25° C. (77° F.), with slight contraction of volume. Miscible, in all proportions, with alcohol, chloroform, petroleum benzin, benzene, fixed and volatile oils.

Ether boils at about 35.5° C. (96° F.), and it should, therefore, boil when a test-tube, containing some broken glass and half filled with it, is held for some time closely grasped in the hand.

Ether is highly volatile and inflammable. Its vapor, when mixed with air and ignited, explodes violently.

The color of light blue litmus paper moistened with water should not be changed to red when the paper is immersed in Ether for ten minutes.

Upon evaporation, Ether should leave *no residue.*

If 10 Cc. of it be poured, in portions, upon clean, odorless blotting paper, and allowed to evaporate spontaneously, *no foreign odor* should become perceptible when the last traces of Ether leave the paper.

When 20 Cc. of Ether are shaken, in a graduated tube, with 20 Cc. of water, just previously saturated with Ether, the ether-layer, upon separation, should measure not less than 19.2 Cc. (absence of an *undue amount of alcohol or water*).

If 10 Cc. of Ether be shaken occasionally, during one hour, with 1 Cc. of potassium hydroxide T.S., no color should be developed in either liquid (absence of *aldehyde*).

Average dose.—1 Cc. (15 minims).

ÆTHER ACETICUS

Acetic Ether

A liquid composed of about 90 percent., by weight, of Ethyl Acetate [$CH_3CO.OC_2H_5 = 87.40$], and about 10 percent. of alcohol containing a little water. It should be kept in well-stoppered bottles, in a cool and dark place, remote from lights or fire.

A transparent, colorless liquid, of a fragrant and refreshing, slightly acetous odor, and a peculiar acetous and burning taste.

Specific gravity: 0.883 to 0.895 at 25° C. (77° F.).

Soluble in about 9 parts of water at 25° C. (77° F.); miscible, in all proportions, with alcohol, ether, fixed and volatile oils.

Boiling point: from 72° to 77° C. (161.6° to 170.6° F.).

Acetic Ether is readily volatilized, even at a low temperature. It is inflammable, burning with a yellowish flame and an acetous odor.

It should not immediately redden blue litmus paper.

Upon evaporation, Acetic Ether should leave no residue.

If a portion be allowed to evaporate spontaneously from clean, odorless blotting paper, the final odor should not resemble that of pineapple (absence of *butylic* and *amylic derivatives*).

When 25 Cc. of Acetic Ether are shaken, in a graduated tube, with 25 Cc. of water just previously saturated with Acetic Ether, upon separation the ethereal layer should not measure less than 22.5 Cc. (absence of an *undue proportion of alcohol* or *water*).

When a small portion of Acetic Ether is carefully poured upon concentrated sulphuric acid, no dark ring should be developed at the point of contact of the two layers (absence of *readily carbonizable, organic impurities*).

Average dose.— 1 Cc. (15 minims).

ÆTHYLIS CARBAMAS

Ethyl Carbamate

$C_3H_7NO_2 = 88.42$

An ester of carbamic acid [$CO(OC_2H_5)NH_2$] obtained by the reaction of ethyl alcohol upon urea (carbamide) or one of its salts. It should be kept in well-stoppered bottles.

Colorless, columnar crystals or scales, odorless, and having a cooling, saline taste.

Soluble in less than 1 part of water, 0.6 part of alcohol, 1 part of ether, 1.3 parts of chloroform, and 3 parts of glycerin, at 25° C. (77° F.).

When heated between 47.5° and 50° C. (117.5° and 122° F.) it melts, and at a higher temperature is decomposed, burning without leaving a weighable residue.

If 1 Gm. of Ethyl Carbamate be added to 5 Gm. of sulphuric acid and gently heated, it is decomposed with the evolution of carbon dioxide, while alcohol and acid ammonium sulphate remain in solution.

If 1 Gm. of Ethyl Carbamate be heated with 5 Cc. of concentrated potassium hydroxide solution, ammonia gas is given off, recognizable by the usual tests.

If 0.5 Gm. of Ethyl Carbamate be dissolved in 5 Cc. of water with 1 Gm. of dry sodium carbonate and 0.01 Gm. of iodine, and the solution warmed, yellow crystals of iodoform should separate on cooling.

If 6 Gm. of Ethyl Carbamate be dissolved in 6 Cc. of water, and the solution be divided into 3 equal parts, the addition severally of 5 Cc. of nitric acid, of mercuric nitrate T.S., or of oxalic acid T.S. should not produce a white precipitate (distinction from, and absence of, *urea* or *carbamide*).

Average dose.— 1 Gm. (15 grains).

ÆTHYLIS CHLORIDUM

Ethyl Chloride

A haloid derivative [Monochlor-Ethane, $C_2H_5Cl = 64.00$], prepared by the action of hydrochloric acid gas upon absolute ethyl alcohol.

On account of its extreme volatility, it should be preserved in hermetically sealed glass tubes, and kept in a cool place, remote from lights or fire.

A colorless, mobile, very volatile liquid, having a characteristic, rather agreeable odor, and a burning taste.

Specific gravity: 0.911 to 0.916 at 8° C. (46.4° F.).

Ethyl Chloride is slightly soluble in water, readily soluble in alcohol.

It boils at a temperature of 12.5° to 13° C. (54.5° to 55.4° F.), and at its ignition temperature burns with a smoky, green-edged flame, with the production of gaseous hydrochloric acid.

When liberated, at ordinary room-temperatures, from its sealed glass tube, Ethyl Chloride vaporizes at once; the gas is very inflammable, and consequently it should not be used in proximity to a gas-flame or fire.

If 10 Cc. of Ethyl Chloride, while cold, be dissolved in alcohol, and a few drops of silver nitrate T.S. be added, no turbidity should be produced (absence of *hydrochloric acid*).

If 10 Cc. of Ethyl Chloride be agitated with 10 Cc. of cold water, and the supernatant stratum of Ethyl Chloride be evaporated spontaneously, and if a few drops of potassium dichromate T.S. be added to the remaining aqueous liquid, followed by some diluted sulphuric acid, and the mixture be boiled, no odor of aldehyde should be developed, and a greenish or purplish color should not be produced in the liquid (absence of *alcohol*).

On allowing Ethyl Chloride to evaporate from clean, odorless blotting paper which has been saturated with it, no unpleasant odor should remain upon the paper (absence of *sulphur compounds*, etc.).

ALCOHOL

Alcohol

A liquid composed of about 92.3 percent., by weight, or about 94.9 percent., by volume, of absolute Ethyl Alcohol [$C_2H_5.OH = 45.70$], and about 7.7 percent., by weight, of water. It should be kept in well-closed vessels, in a cool place, remote from lights or fire.

A transparent, colorless, mobile and volatile liquid, of a slight, agreeable odor, and a burning taste.

Specific gravity: about 0.816 at 15.6° C. (60° F.), the standard temperature for Alcohol, or 0.809 at 25° C. (77° F.).

Miscible with water in all proportions, and without any trace of cloudiness; also miscible with ether or chloroform.

It is readily volatilized, even at low temperatures, and boils at 78° C. (172.4° F.). It is inflammable, and burns with a pale blue, smokeless flame.

It should not affect the color of blue or red litmus paper previously moistened with water.

If 50 Cc. of Alcohol be evaporated in a clean glass vessel, no *color* or *weighable residue* should remain.

If 10 Cc. of Alcohol be mixed with 5 Cc. of water and 1 Cc. of glycerin, and the mixture allowed to evaporate spontaneously from a piece of clean, odorless blotting paper, *no foreign odor* should become perceptible when the last traces of the Alcohol leave the paper (absence of *fusel oil constituents*).

If 25 Cc. be allowed to evaporate spontaneously in a porcelain evaporating dish, carefully protected from dust, until the surface of the dish is barely moist, no red or brown color should be produced upon the addition of a few drops of colorless, concentrated sulphuric acid (absence of *amyl alcohol*, or *non-volatile, carbonizable, organic impurities*, etc.).

If 10 Cc. of Alcohol be mixed in a test-tube with 5 Cc. of potassium hydroxide T.S., the liquid should not at once assume a yellow color (absence of *aldehyde* or *oak tannin*).

If 20 Cc. of Alcohol be shaken in a clean, glass-stoppered vial with 1 Cc. of silver nitrate T.S., the mixture should not become more than faintly opalescent, or acquire more than a faint brownish tint when exposed for six hours to diffused daylight (limit of *organic impurities, amyl alcohol, aldehyde*, etc.).

Methyl Alcohol Test.—Into a test-tube of the capacity of about 40 cubic centimeters, 1 Cc. of the Alcohol or spirit to be tested should be poured, and, if it be undiluted, enough distilled water added to make the liquid measure 10 Cc. If the alcohol be already diluted, a correspondingly larger volume of it should be taken and diluted to 10 Cc., so that the proportion of alcohol in the liquid shall not be more than about 10 percent., by volume. A copper wire spiral (made by winding 1 meter of No. 18 clean copper wire closely around a glass rod 7 millimeters thick, making a coil about 3 centimeters long, the end of the wire being formed into a handle) should be heated to redness in a flame free from soot, and plunged steadily quite to the bottom of the liquid in the test-tube and held there for a second or two, then withdrawn and dipped into water to cool. This treatment with red-hot copper should be repeated five or six times, immersing the test-tube in cold water to keep down the temperature of the liquid. The contents of the test-tube should now be filtered into a wide test-tube and boiled very gently. If the odor of acetaldehyde be perceptible, the boiling is to be continued until the odor ceases to be distinguished clearly. The liquid is now cooled, and to it should be added 1 drop of a solution containing 1 part of resorcinol in 200 parts of water. A portion of this liquid is then poured cautiously into a second tube containing pure sulphuric acid, in such a way that the two liquids shall not mix, the tube being held in an inclined position; this tube is allowed to stand for three minutes, and then slowly rotated. No rose-red ring should show at the line of contact of the two layers (absence of more than 2 percent. of *methyl alcohol*).

ALCOHOL ABSOLUTUM

Absolute Alcohol

Ethyl Alcohol [$C_2H_5.OH = 45.70$], containing not more than 1 percent., by weight, of water. It should be kept in well-stoppered bottles or tin cans, in a cool place, remote from lights or fire.

A transparent, colorless, mobile, and volatile liquid, of a characteristic, rather agreeable odor, and a burning taste. Very hygroscopic.

Specific gravity: not higher than 0.797 at 15.6° C. (60° F.); or 0.790 at 25° C. (77° F.).

In other respects Absolute Alcohol has the properties, and should respond to the reactions and tests, of Alcohol (see *Alcohol*).

ALCOHOL DILUTUM

Diluted Alcohol

A liquid composed of about 41.5 percent., by weight, or about 48.9 percent., by volume, of absolute Ethyl Alcohol [$C_2H_5.OH = 45.7$], and about 58.5 percent., by weight, of water. It should be kept in well-closed vessels, in a cool place, remote from lights or fire.

Alcohol, *five hundred cubic centimeters*	500 Cc.
Distilled Water, *five hundred cubic centimeters*	500 Cc.

Mix them.

If the two liquids be measured at the temperature of 25° C. (77° F.), the mixture, when cooled to the same temperature, will measure about 970 Cc.

Diluted Alcohol may also be prepared in the following manner:

Alcohol, *four hundred and eight grammes*	408 Gm.
Distilled Water, *five hundred grammes*	500 Gm.

Mix them.

Diluted Alcohol has a specific gravity of about 0.936 at 15.6° C. (60° F.), the standard temperature for Alcohol, and about 0.930 at 25° C. (77° F.).

It should respond to the reactions and tests given under *Alcohol.*

Rules for making an Alcohol of any required lower Percentage from an Alcohol of any given higher Percentage:

I. **By Volume.**—Designate the volume-percentage of the stronger alcohol by *V*, and that of the weaker alcohol by *v*.

Rule.—Mix *v* volumes of the stronger alcohol with distilled water to make *V* volumes of product. Allow the mixture to stand until full contraction has taken place, and until it has cooled, then make up the deficiency in the *V* volumes by adding more distilled water.

Example.—An alcohol of 30 percent. by volume is to be made from an alcohol of 94.9 percent. by volume.—Take 30 volumes of the 94.9 percent. alcohol, and add enough distilled water to produce 94.9 volumes.

II. **By Weight.**—Designate the weight-percentage of the stronger alcohol by *W*, and that of the weaker alcohol by *w*.

Rule.—Mix *w* parts by weight of the stronger alcohol with distilled water to make *W* parts by weight of product.

Example.—An alcohol of 50 percent. by weight is to be made from an alcohol of 92.3 percent. by weight.—Take 50 parts by weight of the 92.3 percent. alcohol, and add enough distilled water to produce 92.3 parts by weight.

ALOE

Aloes

[ALOE BARBADENSIS, ALOE SOCOTRINA, PHARM. 1890]

The inspissated juice of the leaves of *Aloe vera* (Linné) Webb, *Aloe Chinensis* Baker, *Aloe Perryi* Baker, or other species of *Aloe* (Fam. *Liliaceæ*).

In yellowish-brown or orange-brown to blackish-brown opaque masses; translucent in thin fragments; fracture uneven, dull and waxy, somewhat resinous, or smooth and glassy, somewhat conchoidal; occasionally exhibiting microscopic crystals of aloin; odor characteristic; taste nauseous, bitter.

Aloes gives a reddish color with nitric acid or with solutions of the alkalies.

If Aloes be dried at 100° C. (212° F.) until it ceases to lose weight, the loss of moisture should not exceed 10 percent.

A solution of Aloes in hot water yields, with a concentrated solution of sodium borate, a mixture having a greenish fluorescence.

If to 5 Gm. of Aloes 60 Cc. of boiling water be added, a nearly clear solution should be obtained, from which not more than 2 Gm. should separate on cooling.

If to 1 Gm. of Aloes 5 Cc. of Alcohol be added, and the mixture gently heated, a nearly clear solution should be obtained after cooling the liquid (absence of *gum*, *dextrin*, and *inorganic impurities*).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

ALOE PURIFICATA

Purified Aloes

Aloes, *one thousand grammes*	1000 Gm.
Alcohol, *two hundred cubic centimeters*	200 Cc.

Heat the Aloes, by means of a water-bath, until it is completely melted. Then add the Alcohol, and, having stirred the mixture thoroughly, strain it through a No. 60 sieve, which has just been dipped into boiling water. Evaporate the strained mixture by means of a water-bath, constantly stirring, until a thread of the mass becomes brittle on cooling. Lastly, break the product, when cold, into pieces of a convenient size, and keep it in well-stoppered bottles.

Purified Aloes is in irregular, brittle pieces of a dull-brown or reddish-brown color, and having the peculiar odor of Aloes. It is almost entirely soluble in alcohol.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

ALOINUM

Aloin

A neutral principle obtained from Aloes, varying more or less in chemical composition and physical properties according to the source from which it is obtained. Chiefly prepared from Curaçao Aloes.

A micro-crystalline powder or minute acicular crystals, lemon-yellow to dark yellow in color, possessing a slight odor of aloes and an intensely bitter taste.

It is slightly hygroscopic, the air-dried powder yielding 1 molecule of water of crystallization at 100° C. (212° F.).

Aloin from Curaçao Aloes is almost completely soluble in 120 parts of water, 15 parts of alcohol, and 55 parts of acetone.

When ignited, it is consumed without leaving a residue.

Aloin dissolves in water, forming a yellow solution, which is neutral to litmus paper, turns brown on standing, and has an intensely bitter taste.

Ammonia water and alkali-solutions dissolve Aloin, forming a yellow solution, soon turning red and exhibiting a greenish-red fluorescence.

Nitric Acid dissolves Aloin from Curaçao Aloes, forming a cherry-red solution (distinction from *Nataloin*, *Socaloin*, and *Capaloin*).

Aloin when added to alkaline solutions is rapidly decomposed, but if mixed with acid solutions decomposition is slower. Aloin added in minute quantity to concentrated sulphuric acid forms a yellowish-red solution which, upon the addition of a small crystal of potassium dichromate, changes to an olive-green, then to a dark green, and finally, on standing, to a blue. If a large amount of potassium dichromate be used, the yellowish-red solution first turns purple, then brown, and finally green. Bromine water added to the aqueous solution of Aloin produces a pink color. Gold chloride T.S., when added to an aqueous solution of Aloin, turns it carmine-red, changing later to violet. A drop of ferric chloride T.S. added to an alcoholic solution of Aloin produces a brownish-green color.

If to a dilute aqueous solution of Aloin obtained from Curaçao Aloes, 1 drop of copper sulphate T.S. be added, a bright yellow color will be produced; upon adding a few drops of a concentrated solution of sodium chloride, the liquid will acquire a red color, and upon the further addition of a little alcohol the color will be changed to violet (distinction from *Nataloin* and *Capaloin*).

On shaking 1 Gm. of Aloin with 10 Cc. of benzene for one minute and filtering, the filtrate should not impart more than a faint pink color to an equal volume of ammonia water (5 percent.), when shaken with it (limit of *emodin*).

***Average dose.*—0.015 Gm. = 15 milligrammes (¼ grain).**

ALTHÆA

Althæa

The dried root of *Althæa officinalis* Linné (Fam. *Malvaceæ*), collected from plants of the second year's growth, and deprived of the periderm.

Slenderly tapering, 15 to 30 Cm. long, rarely exceeding 20 Mm. in diameter; externally whitish, traversed longitudinally by several broad, shallow furrows, and covered with loosened bast fibres; fracture of bark fibrous, of wood short and granular; internally yellowish-white; odor faint; taste sweetish, mucilaginous.

The powder contains rosette-shaped crystals of calcium oxalate, about 0.025 Mm. in diameter, and ellipsoidal starch grains from 0.010 to 0.020 Mm. in diameter.

ALUMEN

Alum

$AlK(SO_4)_2 + 12H_2O = 471.02$

It should contain not less than 99.5 percent. of pure Aluminum and Potassium Sulphate.

Large, colorless, octahedral crystals, sometimes modified by cubes, or in crystalline fragments; without odor, but having a sweetish and strongly astringent taste.

Soluble in 9 parts of water at 25° C. (77° F.), and in 0.3 part of boiling water; it is also freely soluble in warm glycerin, but insoluble in alcohol.

When gradually heated, it loses water; at 92° C. (197.6° F.) it fuses, and if the heat be gradually increased to 200° C. (392° F.), it loses all of its water of crystallization (45.55 percent. of its weight), leaving a voluminous, white residue (see *Alumen Exsiccatum*).

An aqueous solution of Alum has an acid reaction upon blue litmus paper.

An aqueous solution of the salt affords, with ammonia water, a white, gelatinous precipitate, which is almost insoluble in an excess of ammonia; with barium chloride T.S., a white precipitate, insoluble in hydrochloric acid.

When a saturated solution of Alum is shaken with sodium bitartrate T.S., it produces, within half an hour, a white, crystalline precipitate.

The aqueous solution of Alum affords, with potassium hydroxide T.S., a white, gelatinous precipitate, which is completely soluble in an excess of the alkali.

The aqueous solution of the salt (1 in 20) should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121). (The subsequent addition of ammonia water, as directed in this test, should be omitted.)

The addition of 5 drops of potassium ferrocyanide T.S. to 20 Cc. of an aqueous solution of alum (1 in 150) should not at once produce a blue coloration (limit of *iron*).

Average dose.—0.500 Gm. = 500 milligrammes ($7\frac{1}{2}$ grains).

ALUMEN EXSICCATUM

Exsiccated Alum

$AlK(SO_4)_2 = 256.46$

Exsiccated Alum should contain not less than 99 percent. of pure anhydrous Aluminum and Potassium Sulphate.

Alum, in small pieces, *one hundred grammes*	100 Gm.
To make *fifty-five grammes* . .	55 Gm.

Place the Alum in a tared shallow porcelain dish so as to form a thin layer, and heat it on a sand-bath until it liquefies. Then continue the application of a moderate heat, with constant stirring, until aqueous vapor ceases to be disengaged and a dry, white, porous mass weighing *fifty-five grammes* is obtained. When cold, reduce the product to a fine powder, and preserve it in well-stoppered bottles.

A white, granular powder, without odor, possessing a sweetish, astringent taste, and attracting moisture on exposure to the air.

It is very slowly but completely soluble in about 17 parts of water at 25° C. (77° F.), and quickly soluble in 1.4 parts of boiling water.

Its aqueous solution should respond to the reactions and tests given under *Alumen*.

ALUMINI HYDROXIDUM

Aluminum Hydroxide

[Alumini Hydras, Pharm. 1890]

Alum, *one hundred grammes*	100 Gm.
Monohydrated Sodium Carbonate, *forty-three grammes* . .	43 Gm.
Water, *a sufficient quantity*.	

Dissolve each salt separately in *one thousand cubic centimeters* of Water, filter the solutions and heat them to boiling. Then having poured the hot solution of Monohydrated Sodium Carbonate into a capacious vessel, gradually pour in the hot solution of Alum with constant stirring, and add *two thousand cubic centimeters* of boiling Water. Allow the precipitate to subside, decant the clear liquid, and pour upon the precipitate *two thousand cubic centimeters* of hot Water. Again decant, transfer the precipitate to a strainer, and wash it with hot Water, until the washings produce not more than a faint cloudiness with barium chloride T.S. Then allow it to drain, dry it at a temperature not exceeding 40° C. (104° F.), and reduce it to a uniformly fine powder.

A white, light, amorphous powder, odorless and tasteless, and permanent in dry air.

Insoluble in water or alcohol, but completely soluble in hydrochloric or sulphuric acid, and also in potassium hydroxide T.S.

When heated to redness, it loses about 34 percent. of its weight.

A solution of 1 Gm. of Aluminum Hydroxide in 20 Cc. of diluted hydrochloric acid and 130 Cc. of water should not at once assume a blue color on the addition of 1 drop of potassium ferrocyanide T.S. (limit of *iron*), and should not give more than a faint cloudiness with barium chloride T.S. (limit of *sulphate*).

If 1 Gm. of the powder be boiled with 20 Cc. of distilled water, and the liquid filtered, the filtrate should not have an alkaline reaction, and on evaporation should leave a residue weighing not more than 0.005 Gm. (limit of *alkali salts*).

A solution of the powder (1 in 20) in diluted hydrochloric acid should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121). (The subsequent addition of ammonia water, as directed in this test, should be omitted.)

ALUMINI SULPHAS

Aluminum Sulphate

$Al_2(SO_4)_3 + 16H_2O = 625.93$

It should contain not less than 99.5 percent. of pure Aluminum Sulphate.

A white, crystalline powder, or shining plates, or crystalline fragments; without odor, having a sweetish and afterwards an astringent taste, and permanent in the air.

Soluble in 1 part of water at 25° C. (77° F.), more soluble in boiling water, but insoluble in alcohol.

When gradually heated to about 200° C. (392° F.), it loses its water of crystallization (45.7 percent. of its weight).

The aqueous solution of the salt has an acid reaction upon blue litmus paper.

The aqueous solution of the salt yields, with barium chloride T.S., a white precipitate insoluble in hydrochloric acid; and with potassium hydroxide T.S., a white, gelatinous precipitate which is soluble in an excess of the alkali, but which is again separated on the addition of a sufficient amount of ammonium chloride T.S.

If 1 Gm. of Aluminum Sulphate be gently heated with 5 Cc. of potassium hydroxide T.S., the liquid should not evolve the odor of *ammonia*.

A filtered, aqueous solution of the salt (1 in 10) should not become more than faintly opalescent within five minutes after the addition of an equal volume of tenth-normal sodium thiosulphate V.S. (limit of *free acid*).

The aqueous solution of the salt (1 in 20) should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121). (The subsequent addition of ammonia water, as directed in this test, should be omitted.)

The addition of 5 drops of potassium ferrocyanide T.S. to 20 Cc. of the aqueous solution of the salt (1 in 150) should not produce at once a blue coloration (limit of *iron*).

AMMONII BENZOAS

Ammonium Benzoate

$NH_4C_7H_5O_2 = 138.06$

It should contain not less than 98 percent. of pure Ammonium Benzoate [$C_6H_5.COONH_4$], and should be kept in well-stoppered bottles.

Thin, white, laminar crystals or a crystalline powder; odorless, or having a slight odor of benzoic acid, a saline, bitter, afterwards slightly acid taste, and gradually losing ammonia on exposure to the air.

Soluble in about 10.5 parts of water and 28 parts of alcohol at 25° C. (77° F.), in 1.2 parts of boiling water, and in 7.6 parts of boiling alcohol.

The salt fuses at 193° to 194° C. (379.4° to 381.2° F.), with decomposition, and when strongly heated emits vapors having the odor of ammonia and benzoic acid, and is finally completely volatilized.

The aqueous solution of the salt is neutral, or very slightly reddens blue litmus paper.

A saturated aqueous solution of Ammonium Benzoate affords with ferric chloride T.S. a flesh colored precipitate, and when such a solution is gently heated with potassium hydroxide T.S. ammonia is evolved.

If diluted nitric acid be added in slight excess to the aqueous solution of the salt (1 in 10), the precipitated benzoic acid, after collecting and washing, should respond to the tests of purity and identity given under *Acidum Benzoicum*, and the filtrate from this precipitate should not be affected by barium chloride T.S. (absence of *sulphate*), or by silver nitrate T.S. (absence of *chloride*).

If the aqueous solution of the salt (1 in 20) be acidulated with hydrochloric acid and filtered, the filtrate should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Average dose. — 1 Gm. (15 grains).

AMMONII BROMIDUM

Ammonium Bromide

NH_4Br 97.29

It should contain not less than 97 percent. of pure Ammonium Bromide, and should be kept in well-stoppered bottles.

Colorless, transparent, prismatic crystals, or a white, crystalline powder; odorless, of a pungent, saline taste, and permanent in dry air.

Soluble in 1.2 parts of water, and in 12.5 parts of alcohol at 25° C. (77° F.), in 0.7 part of boiling water, and in 9 parts of boiling alcohol.

When heated, Ammonium Bromide volatilizes completely, without fusing.

An aqueous solution of the salt slightly reddens blue litmus paper.

When the aqueous solution is gently heated with potassium hydroxide T.S., ammonia is evolved.

Silver nitrate T.S. produces a yellowish-white precipitate, insoluble in nitric acid or in a moderate excess of ammonia water.

If to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform be added, and if chlorine water, which has been diluted with an equal volume of water, be cautiously introduced drop by drop, with constant agitation, the liberated bromine will dissolve in the chloroform, imparting to it a yellow to orange color, free from any violet tint (absence of *iodide*).

If a few drops of diluted sulphuric acid be brought in contact with a little of the powdered salt on a porcelain plate, the salt should not at once assume a yellowish color (absence of *bromate*).

An aqueous solution of the salt (1 in 150) should not at once assume a blue color with potassium ferrocyanide T.S. (limit of *iron*).

Ten Cc. of an aqueous solution of Ammonium Bromide (1 in 20), when acidulated with acetic acid, should not be rendered turbid by the addition of 1 Cc. of potassium sulphate T.S. (absence of *barium*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 3 Gm. of the salt be dissolved in sufficient water to measure 100 Cc., then 10 Cc. of this solution, after the addition of a few drops of potassium chromate T.S., should require not more than 31.6 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red coloration.

Average dose.— 1 Gm. (15 grains).

AMMONII CARBONAS

Ammonium Carbonate

$C_2H_{11}N_3O_5 = 156.01$

It should contain not less than 97 percent. of a mixture of Acid Ammonium Carbonate [$CO(OH)ONH_4$] and Ammonium Carbamate [$CO(NH_2)ONH_4$], and should yield not less than 31.58 percent. of ammonia gas. It should be kept in well-stoppered bottles, in a cool place. For dispensing purposes, only the translucent portions should be used.

White, hard, translucent, striated masses, having a strong odor of ammonia without empyreuma, and a sharp, saline taste. On exposure to the air, the salt loses both ammonia and carbon dioxide, becoming opaque, and is finally converted into friable, porous lumps, or a white powder.

Slowly but completely soluble in about 4 parts of water at 25° C. (77° F.); it is decomposed by hot water, with the elimination of carbon dioxide and ammonia. By prolonged boiling with water, the salt is completely volatilized. Alcohol dissolves the carbamate, and leaves the acid carbonate.

When heated, Ammonium Carbonate is completely volatilized, without charring.

The aqueous solution effervesces with acids, and shows an alkaline reaction with red litmus paper.

The aqueous solution of the salt (1 in 20), when slightly supersaturated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121). Another portion of this solution should not be affected by barium chloride T.S. (absence of *sulphate*).

The aqueous solution of the salt (1 in 20), on the addition of a slight excess of silver nitrate T.S., and subsequent supersaturation with nitric acid, should neither assume a brown color (absence of *thiosulphate*), nor become more than slightly opalescent within two minutes (limit of *chloride*).

If an aqueous solution containing 1 Gm. of the salt be slightly supersaturated with nitric acid, and then evaporated to dryness on a water-bath, it should afford a colorless and odorless residue, which, upon gentle ignition, should be completely volatilized (absence of *empyreumatic* or *non-volatile matters*).

If 2 Gm. of unaltered, translucent Ammonium Carbonate be dissolved in a mixture of 50 Cc. each of distilled water and normal sulphuric acid V.S., boiled for a few minutes to expel the liberated carbon dioxide, and then cooled, not more than 12.7 Cc. of normal potassium hydroxide V.S. should be required for exact neutralization, litmus T.S. being used as indicator.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

AMMONII CHLORIDUM

Ammonium Chloride

$NH_4Cl = 53.11$

It should contain not less than 99.5 percent. of pure Ammonium Chloride.

A white, crystalline powder, without odor, having a cooling, saline taste, and permanent in the air.

Soluble in 3 parts of water, in 80 parts of alcohol, and in 10 parts of glycerin, at 25° C. (77° F.), and in 1 part of boiling water.

On ignition, Ammonium Chloride is volatilized, without charring.

The aqueous solution of the salt (1 in 20) in ice-cold water, should not redden blue litmus paper at once; it affords, with silver nitrate T.S., a white, curdy precipitate, which is soluble in ammonia water.

The aqueous solution, when gently heated with potassium hydroxide T.S., evolves ammonia.

The aqueous solution of the salt (1 in 20) should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121), nor should it be affected by barium chloride T.S. (*sulphate*), nor diluted sulphuric acid (*barium*), nor ammonium oxalate T.S. (*calcium*).

When acidulated with hydrochloric acid, the solution should not assume a red color on the addition of a few drops of ferric chloride T.S. (absence of *sulphocyanate*).

Twenty Cc. of the aqueous solution of the salt (1 in 150) should not at once assume a blue color on the addition of 5 drops of potassium ferrocyanide T.S. (limit of *iron*).

If to 1 Gm. of the salt a little nitric acid be added, and the mixture evaporated to dryness in a porcelain dish on a water-bath, a white residue should be obtained, which, when ignited, should yield not more than 0.0005 Gm. of non-volatile residue (limit of *empyreumatic* or *non-volatile substances*).

If 1 Gm. of Ammonium Chloride be dissolved in sufficient distilled water to measure 100 Cc., then 10 Cc. of this solution should, after the addition of 5 drops of potassium chromate T.S., require not less than 18.7 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

AMMONII IODIDUM

Ammonium Iodide

$NH_4I = 143.83$

It should contain not less than 97 percent. of pure Ammonium Iodide, and should be kept in small amber-colored, well-stoppered vials, protected from light.

When deeply colored, the salt should not be dispensed, but it may be deprived of free iodine by adding to its concentrated aqueous solution sufficient ammonium sulphide T.S. to render it colorless, then filtering, and evaporating on a water-bath to dryness.

Minute, colorless, cubical crystals, or a white, granular powder, without odor when colorless, but emitting a slight odor of iodine when colored, and having a sharp, saline taste. The salt is very hygroscopic, and soon becomes yellow or yellowish-brown on exposure to the air and light, owing to the loss of ammonia and the liberation of iodine.

Soluble in 0.6 part of water, and in 9 parts of alcohol at 25° C. (77° F.); in 0.43 part of boiling water, and in 3.7 parts of boiling alcohol.

When heated on platinum foil, Ammonium Iodide evolves vapor of iodine, and volatilizes completely without fusing.

The aqueous solution of the salt shows a neutral reaction to litmus paper, and when gently heated with potassium hydroxide T.S., evolves ammonia.

If to 5 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chlorine water be added, iodine will be liberated and impart to the solution a light reddish-brown color. On agitating the mixture with a few drops of chloroform, the latter will acquire a violet color.

Ten Cc. of the aqueous solution of Ammonium Iodide (1 in 20), when acidulated with hydrochloric acid, should not be rendered turbid by the addition of 1 Cc. of potassium sulphate T.S. (absence of *barium*).

An aqueous solution of the salt (1 in 150) should not at once assume a blue color with potassium ferrocyanide T.S. (limit of *iron*), nor, after being agitated with 1 Cc. of chloroform, should the latter assume a violet color (limit of *free iodine*).

The aqueous solution of Ammonium Iodide (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 0.25 Gm. of the salt, dried at 100° C. (212° F.), be dissolved in 5 Cc. of ammonia water (10 percent.), the solution shaken with 16.9 Cc. of tenth-normal silver nitrate V.S., and the filtrate supersaturated with 5 Cc. of nitric acid, no cloudiness should make its appearance within ten minutes (absence of more than about 3 percent. of *chlorides* or *bromides*).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

AMMONII SALICYLAS

Ammonium Salicylate

$NH_4C_7H_5O_3 = 153.94$

It should contain not less than 98 percent. of pure Ammonium Salicylate [$C_6H_4(OH)COONH_4$], and should be kept in well-stoppered bottles, protected from heat and light.

Colorless, lustrous, monoclinic prisms, or plates, or a white, crystalline powder; odorless, and having at first a slightly saline, bitter taste, with a sweetish after-taste. Permanent in dry air.

Soluble in 0.9 part of water, and 2.3 parts of alcohol at 25° C. (77° F.); freely soluble in boiling water and in 1 part of boiling alcohol.

When heated, the salt fuses with decomposition, giving off inflammable vapors and an odor of phenol, and is finally completely volatilized.

The concentrated aqueous solution should be colorless, it should redden blue litmus paper, and when gently heated with potassium hydroxide T.S. evolves ammonia.

Ferric chloride T.S., added to an excess of a concentrated solution of Ammonium Salicylate, produces a dark red precipitate, but imparts to a very dilute solution (1 in 100) a deep violet-blue color.

If copper sulphate T.S. be added to the aqueous solution of the salt (1 in 20), a green color will be produced.

If to 0.2 Gm. of the salt, contained in a test-tube, about 1 Cc. of concentrated sulphuric acid be added, and then cautiously about 1 Cc. of methyl alcohol, drop by drop, on heating the mixture to boiling, methyl salicylate will be formed, which can be recognized by its odor.

If an aqueous solution of Ammonium Salicylate (1 in 20) be acidulated with hydrochloric acid and filtered, the filtrate should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If diluted nitric acid be added in slight excess to the aqueous solution of the salt (1 in 10), the precipitated salicylic acid, after collecting and washing, should respond to the tests of purity and identity given under *Acidum Salicylicum.*

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

AMMONII VALERAS

Ammonium Valerate

[AMMONII VALERIANAS, PHARM. 1890]

Ammonium Valerate should be kept in well-stoppered bottles.

Colorless, or white, quadrangular plates, emitting the odor of valeric acid, of a sharp and sweetish taste, and deliquescent in moist air.

Very soluble in water and in alcohol; also soluble in ether.

When heated, the salt fuses, gives off vapor of ammonia and of valeric acid, and is finally completely volatilized.

The aqueous solution shows an acid reaction to blue litmus paper, and, when gently heated with potassium hydroxide T.S., evolves ammonia.

If a concentrated, aqueous solution of Ammonium Valerate be slightly supersaturated with sulphuric acid, an oily layer of valeric acid will rise to the surface.

If a neutral solution of the salt be completely precipitated by ferric chloride T.S., the filtrate should not possess a deep red color (absence of *acetate*).

The aqueous solution of the salt (1 in 20), when slightly acidulated with hydrochloric acid and filtered through a small, wetted filter, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

AMYGDALA AMARA

Bitter Almond

The ripe seed of *Prunus Amygdalus* Stokes, var. *amara* De Candolle (Fam. *Rosaceæ*).

Ovate or oblong-lanceolate, 20 to 30 Mm. long; seed-coat thin, brown, finely downy; embryo straight, white, and with two plano-convex cotyledons; taste bitter and oily; when triturated with water Bitter Almond yields a milk-white emulsion which emits an odor of hydrocyanic acid.

AMYGDALA DULCIS

Sweet Almond

The ripe seed of *Prunus Amygdalus* Stokes, var. *dulcis* De Candolle (Fam. *Rosaceæ*).

Closely resembling the Bitter Almond (see *Amygdala Amara*), but usually broader, with lighter seed-coat, having a bland, sweetish taste and giving no odor of hydrocyanic acid when triturated with water.

AMYLIS NITRIS

Amyl Nitrite

[AMYL NITRIS, PHARM. 1890]

A liquid containing about 80 percent. of Amyl (chiefly Iso-amyl) Nitrite [$C_5H_{11}NO_2 = 116.24$], when assayed by the process given below. It should be kept in hermetically sealed glass bulbs, or in dark amber-colored, glass-stoppered vials, in a cool and dark place.

A clear, yellowish liquid, of a peculiar, ethereal, fruity odor, and a pungent, aromatic taste.

Specific gravity: 0.865 to 0.875 at 25° C. (77° F.).

Almost insoluble in water; miscible, in all proportions, with alcohol or ether.

It is very volatile, even at a low temperature, and is inflammable, burning with a yellow, luminous and sooty flame.

If 1 Cc. of normal potassium hydroxide V.S. and 10 Cc. of water be mixed in a test-tube with a drop of phenolphthalein T.S., then 5 Cc. of Amyl Nitrite added, and the tube inverted a few times, the red tint of the aqueous layer should still be perceptible (limit of *free acid*).

A mixture of 1.5 Cc. of silver nitrate T.S. and 1.5 Cc. of alcohol with a few drops of ammonia water should not become brown or black if 1 Cc. of Amyl Nitrite be added and the mixture gently heated (absence of *aldehyde*).

Amyl Nitrite should remain transparent, or nearly so, when exposed to the temperature of melting ice (absence of *water*).

Assay of Amyl Nitrite

Transfer about 3 Cc. of the Amyl Nitrite, which has been previously shaken with 0.5 Gm. of potassium bicarbonate and carefully decanted, to a tared 100 Cc. measuring flask, and weigh it accurately. Add sufficient alcohol to bring the volume to exactly 100 Cc., and mix thoroughly. Introduce into a nitrometer (see Appendix, Gasometric Estimations) exactly 10 Cc. of the alcoholic solution, followed by 10 Cc. of potassium iodide T.S., and afterwards by 10 Cc. of normal sulphuric acid V.S. When the volume of gas has become constant (within 30 to 60 minutes), note the volume of gas collected. Multiply this volume in Cc., by 4.8, and divide the product by the original weight of the Amyl Nitrite.

At the standard temperature and pressure, the quotient will represent the percentage of Amyl Nitrite in the liquid. The temperature correction is one-third of one percent. of the total percentage just found for each degree,—additive if the temperature is below 25° C. (77° F.), and subtractive if it is above 25° C. (77° F.). The barometric correction is four-thirtieths of one percent. for each millimeter; additive if it is above, and subtractive if it is below 760.

When assayed according to the above method, it should yield not less than 80 percent. of Amyl Nitrite.

Average dose.—0.2 Cc. (3 minims).

AMYLUM

Starch Corn Starch

The starch grains obtained from the fruit of *Zea Mays* Linné (Fam. *Gramineæ*).

In fine powder or irregular, angular white masses, consisting of somewhat spherical, but usually polygonal grains, about 0.010 to 0.025 Mm. in diameter, with a lenticular, circular, or triangular central fissure; inodorous and tasteless; insoluble in cold water or alcohol; forming a whitish jelly when boiled with water, which when cool gives a deep blue color with iodine T.S.; triturated with cold water, showing neither acid nor alkaline reaction with litmus paper; when completely incinerated, leaving not more than 1 percent. of ash.

When freed from water by careful drying in a current of warm air, Starch should show not less than 95 percent. of hydrolyzable carbohydrate.

ANISUM

Anise

The ripe fruit of *Pimpinella Anisum* Linné (Fam. *Umbelliferæ*), obtained from cultivated plants.

Ovoid, laterally compressed, 4 to 5 Mm. long; carpels usually cohering and attached to a slender pedicel; grayish or greenish-gray to grayish-brown; each with a flat face and five light brown filiform ridges and about 16 oil-tubes; odor and taste agreeable and aromatic.

No mouse-like odor should be developed when solution of potassium hydroxide is poured upon Anise (absence of *conium*).

The powder contains one-celled, straight or curved, non-secreting hairs, which vary from 0.025 to 0.100 Mm. in length.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

ANTHEMIS

Anthemis

The dried flower-heads of *Anthemis nobilis* Linné (Fam. *Compositæ*), collected from cultivated plants.

Subglobular, 1.5 to 2 Cm. broad, consisting of an imbricated involucre and numerous white, strap-shaped, obscurely three-toothed ray florets, and usually a few tubular disk florets, inserted upon a chaffy, conical, solid receptacle; odor agreeable; taste strongly aromatic and bitter.

Average dose.— 2 Gm. (30 grains).

ANTIMONII ET POTASSII TARTRAS

Antimony and Potassium Tartrate

$2K(SbO)C_4H_4O_6 + H_2O = 659.80$

It should contain not less than 99.5 percent. of pure Antimony and Potassium Tartrate [$2C_2H_2(OH)_2(COOK)COOSbO + H_2O$].

Colorless, transparent crystals of the rhombic system, becoming opaque and white on exposure to air, or a white, granular powder; without odor, and having a sweet, afterwards disagreeable, metallic taste.

Soluble in 15.5 parts of water at 25° C. (77° F.), and in 3 parts of boiling water, but insoluble in alcohol, which precipitates it from its aqueous solution in the form of a crystalline powder.

When heated to 110° C. (230° F.) in a vacuum, the salt loses its water of crystallization (2.71 percent.). When heated to redness, it chars, emits an odor resembling that of burning sugar, and leaves a blackened residue having an alkaline reaction.

The aqueous solution of the salt possesses a slightly acid reaction, and yields with hydrochloric acid a white precipitate, soluble in an excess of the acid; but no precipitate occurs if tartaric acid has previously been added.

In a solution of Antimony and Potassium Tartrate, acidulated with hydrochloric acid, hydrogen sulphide T.S. produces an orange-red precipitate, which is soluble in ammonium sulphide T.S. and potassium hydroxide T.S.

Antimony and Potassium Tartrate is precipitated from its aqueous solution by tannic acid T.S., and yields a white precipitate with solutions of the alkaline carbonates and hydroxides, soluble in excess of the latter.

An aqueous solution of the salt (1 in 100), acidulated with acetic acid, should not be affected by the addition of a few drops of barium chloride T.S. (absence of *sulphate*), silver nitrate T.S. (*chloride*), ammonium oxalate T.S. (*calcium*), or potassium ferrocyanide T.S. (*iron*).

If to the aqueous solution of the salt (1 in 100) just sufficient sodium hydroxide T.S. be added to redissolve the precipitate formed, and if to this solution an equal volume of freshly prepared hydrogen sulphide T.S. be added, no coloration should be noticeable after standing in a warm place for half an hour when viewed by reflected light while held against a white surface (absence of *heavy metals*).

On adding sodium carbonate T.S. to crushed crystals of the salt, effervescence should not occur (absence of *potassium bitartrate*).

If 0.1 Gm. of Antimony and Potassium Tartrate be dissolved in 5 Cc. of hydrochloric acid, the solution should not respond to Bettendorf's Test for *arsenic* (see Appendix, Test No. 16).

If 1 Gm. of Antimony and Potassium Tartrate be dissolved in sufficient water to measure 100 Cc., then 33 Cc. (32.99 Cc.) of this solution should, after the addition of 20 Cc. of a cold saturated aqueous solution of sodium bicarbonate and a little starch T.S., require not less than 19.9 Cc. of tenth-normal iodine V.S. to produce a permanent blue color (each Cc. corresponding to 5 percent. of the pure salt). Titration should begin immediately after the addition of the sodium bicarbonate solution.

Average dose.—
Expectorant, 0.005 Gm. = 5 milligrammes ($\frac{1}{10}$ grain).
Emetic, 0.030 Gm. = 30 milligrammes ($\frac{1}{2}$ grain).

ANTIPYRINA

Antipyrine

$C_{11}H_{12}N_2O = 186.75$

Phenyldimethylpyrazolon [$C_3HN_2O(CH_3)_2.C_6H_5$], obtained by the condensation of phenylhydrazine with aceto-acetic ether, and methylation of the product.

A colorless, almost odorless, crystalline powder or in tabular crystals, with a slightly bitter taste.

Soluble in less than 1 part of water, in 1 part of alcohol, 1 part of chloroform, and in 30 parts of ether at 25° C. (77° F.).

When heated to 113° C. (235.4° F.) it melts. Upon ignition it is consumed without leaving a weighable residue.

The aqueous solution has a neutral reaction upon litmus paper, but Antipyrine unites directly with acids to form salts.

If to an aqueous solution of Antipyrine, tannic acid T.S. be added, an abundant white precipitate (tannate) is formed.

If 0.1 Gm. of sodium nitrite and 12 Cc. of an aqueous solution of Antipyrine (1 in 100), be mixed, a nearly colorless liquid is obtained, which, upon the addition of 1 Cc. of diluted sulphuric acid, develops a deep green color (formation of *isonitroso-antipyrine*).

If to 2 Cc. of a dilute aqueous solution of Antipyrine (1 in 1000) 1 drop of ferric chloride T.S. be added, a deep red color is produced, which upon the addition of 10 drops of sulphuric acid is changed to light yellow.

Two Cc. of an aqueous solution of Antipyrine (1 in 100) mixed with an equal volume of nitric acid assumes a yellowish color, passing to crimson on warming (distinction from *acetanilide* and *acetphenetidin*).

On warming 0.1 Gm. of Antipyrine with sodium hydroxide T.S., and again warming after the addition of chloroform, the disagreeable odor of phenyl-isocyanide should not be developed (absence of *acetanilide*).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

APOCYNUM

Apocynum

The dried rhizome of *Apocynum cannabinum* Linné, or of closely allied species of Apocynum (Fam. *Apocynaceæ*).

Of varying length, 3 to 8 Mm. thick, cylindrical or with a few angles produced by drying, lightly wrinkled longitudinally, and usually more or less fissured transversely; orange-brown, becoming gray-brown on keeping; brittle; fracture sharply transverse, exhibiting a thin brown layer of cork, the remainder of the bark nearly as thick as the radius of the wood, white or sometimes pinkish, starchy, containing lacticiferous ducts; the wood yellowish, having several rings, finely radiate and very coarsely porous; almost inodorous, the taste starchy, afterwards becoming bitter and somewhat acrid.

Average dose.— 1 Gm. (15 grains).

APOMORPHINÆ HYDROCHLORIDUM

Apomorphine Hydrochloride

$C_{17}H_{17}NO_2.HCl = 301.34$

[APOMORPHINÆ HYDROCHLORAS, PHARM. 1890]

The hydrochloride [$HCl.C_{17}H_{17}NO_2$] of an alkaloid prepared from morphine by the abstraction of one molecule of water. It should be kept in small, dark amber-colored vials, which have been previously rinsed with diluted hydrochloric acid and dried.

Minute grayish-white monoclinic prisms, glistening, odorless, having a slightly bitter taste, and acquiring a greenish tint upon exposure to light and air.

Soluble in 39.5 parts of water, 38.2 parts of alcohol, 1864 parts of ether, and in 3800 parts of chloroform at 25° C. (77° F.); soluble in 16 parts of water at 80° C. (176° F.), and in 30 parts of alcohol at 60° C. (140° F.).

The salt decomposes between 200° and 210° C. (392° and 410° F.).

The aqueous solution shows a neutral reaction with litmus paper.

If the salt imparts at once an emerald-green color to 100 parts of water on being shaken with it a few times in a test-tube, it should be rejected.

Apomorphine Hydrochloride is not colored when treated with sulphuric acid; with nitric acid a deep purple color fading to orange is produced; with sulphuric acid containing a trace of selenous acid, a dark blue color, fading to violet, and then turning black; with sulphuric acid containing a trace of nitric acid, a blood-red color, fading to orange; with sulphuric acid containing a trace of ferric chloride, a pale blue color; with sulphuric acid containing a trace of ammonium vanadate, a violet-blue color, changing to deep greenish-blue; with sulphuric acid containing a little paraldehyde, a green color, fading to reddish-brown; with sulphuric acid containing potassium iodate, a black color, changing to brown, and finally to pale brown.

If sulphuric acid be added to a crystal of Apomorphine Hydrochloride and a crystal of potassium nitrate, the latter is colored red, and on stirring with a glass rod the solution becomes green, then blue, then purple, and finally cherry-red. Acetic acid dissolves the salt without color, but on adding a trace of potassium iodate, the solution turns blood-red, changes to purple, and on adding a little ether and shaking, the latter assumes a blue color.

Gold chloride T.S. produces a reddish-purple precipitate in a solution of the salt. Diluted ferric chloride T.S. colors Apomorphine Hydrochloride solution red (distinction from *morphine*, which, by the same test, is colored blue).

Silver nitrate T.S. added to the aqueous solution of the salt throws down a white precipitate, insoluble in nitric acid, soon turning black by reduction to metallic silver, and instantly reduced by the addition of ammonia water.

If 0.05 Gm. of the salt be shaken with a solution made by dissolving 0.05 Gm. of ferrous sulphate in 10 Cc. of water, the solution will gradually turn blue and then black; upon the addition of some alcohol, the solution resumes its blue color (difference from *codeine*, *morphine*, *narceine*, and *narcotine*).

Average dose.—
Expectorant, 0.002 Gm. = 2 milligrammes ($\frac{1}{30}$ grain).
Emetic, 0.005 Gm. = 5 milligrammes ($\frac{1}{10}$ grain).

AQUÆ

Waters Medicated Waters

The Medicated Waters, when prepared from volatile oils, are intended to be, as nearly as practicable, saturated solutions, which must be clear, and free from solid impurities. In the processes which follow, the solution of the volatile oils is facilitated by the use of purified talc; but the solution may, if preferred, be aided by replacing the purified talc by pulped or shredded filter paper; waters may also be made by the addition of volatile oils to hot water and separation of the excess of the former, or by the distillation of the drug or volatile oil with water, if by either of these methods the finished product corresponds in all respects with official requirements.

AQUA

Water

$H_2O = 17.88$

Potable Water in its purest obtainable state.

A colorless, limpid liquid, without odor or taste at ordinary temperatures, and odorless when heated.

Water should be perfectly neutral to litmus paper. 1000 Cc., when concentrated by evaporation to 20 Cc., should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

On evaporating 1000 Cc. of Water on a water-bath, it should not leave a residue weighing more than 0.5 Gm. (limit of *soluble salts*), and this residue, when ignited, should not carbonize, nor evolve *ammoniacal* or *acid* vapors.

If 200 Cc. of Water be acidulated with hydrochloric acid, heated to boiling, and 0.5 Cc. of barium chloride T.S. be added, the liquid, when cooled and filtered, should give no further precipitate on the addition of a few drops of barium chloride T.S., even on standing (limit of *sulphates*).

If 200 Cc. of Water be acidulated with nitric acid, heated to boiling, and 0.5 Cc. of tenth-normal silver nitrate V.S. be added, the liquid, when cooled and filtered, should not be affected by the subsequent addition of a few drops of silver nitrate T.S. (limit of *chlorides*).

If 10 Cc. of Water mixed with a few drops of diphenylamine T.S. be carefully poured upon about 3 Cc. of sulphuric acid, free from nitrous compounds, contained in a test-tube, so as to form a separate layer, no blue color should be formed at the line of contact of the two liquids (limit of *nitrates*).

If to 50 Cc. of Water contained in a glass cylinder 2 Cc. each of sulphanilic acid T.S. and naphthylamine acetate T.S. are added, and the solution well mixed, no distinct pink coloration should appear within five minutes, if the cylinder be placed upon a white surface and viewed from above (limit of *nitrites*).

If to 50 Cc. of Water contained in a glass cylinder 2 Cc. of alkaline mercuric potassium iodide T.S. (Nessler's Reagent) be added and thoroughly mixed, no yellow or brownish tint should be produced immediately; the cylinder should be placed upon a white surface and viewed from above (limit of *ammonia*).

On heating to boiling 100 Cc. of Water, acidulated with 10 Cc. of diluted sulphuric acid, and subsequently adding 0.4 Cc. of tenth-normal potassium permanganate V.S., the pink color of the liquid should not be completely destroyed after it has been boiled for ten minutes (limit of *organic* or *other oxidizable substances*).

AQUA AMMONIÆ

Ammonia Water

An aqueous solution of Ammonia [$NH_3 = 16.93$] containing 10 percent., by weight, of gaseous ammonia. This solution deteriorates on keeping, and should be tested frequently. It must not be dispensed for medicinal purposes if it contains less than 10 percent., by weight, of the gas. Ammonia Water should be kept in glass-stoppered bottles, in a cool place.

A colorless, transparent liquid, having a very pungent, characteristic odor, a caustic alkaline taste, and a strongly alkaline reaction upon red litmus paper.

Specific gravity: 0.958 at 25° C. (77° F.).

It is completely volatilized at 100° C. (212° F.).

On bringing a glass rod dipped into hydrochloric acid near cold Ammonia Water, dense white fumes are produced.

If 0.1 Cc. of tenth-normal potassium permanganate V.S. be added to 10 Cc. of Ammonia Water, which has been slightly supersaturated with diluted sulphuric acid, the pink color should not be completely destroyed within ten minutes (limit of *readily oxidizable substances*).

When neutralized and made slightly acid with hydrochloric acid, Ammonia Water should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If Ammonia Water be slightly supersaturated with nitric acid, it should not be affected by barium chloride T.S. (absence of *sulphates*), nor by silver nitrate T.S. (*chlorides*); and if a third portion of the acidulated liquid be evaporated on a water-bath to dryness, it should afford a colorless residue, which, on ignition, should be completely volatilized (absence of *coal-tar bases* and of *fixed impurities*).

Introduce into a stoppered weighing-bottle 3 Cc. of Ammonia Water and weigh accurately. Dilute with 50 Cc. of distilled water and titrate with normal sulphuric acid V.S., using litmus or methyl-orange T.S. as indicator. Multiply the number of Cc. of the normal sulphuric acid V.S. consumed, by 1.693, and divide this product by the weight of the Ammonia Water taken; the quotient represents the percentage of ammonia gas.

Average dose.—1 Cc. (15 minims).

AQUA AMMONIÆ FORTIOR

Stronger Ammonia Water

An aqueous solution of Ammonia [$NH_3 = 16.93$] containing 28 percent., by weight, of gaseous ammonia. This solution deteriorates on keeping, and should be tested frequently. Stronger Ammonia Water should be kept in partially filled, strong, glass-stoppered bottles, in a cool place. Great caution should be used in handling this liquid.

A colorless, transparent liquid, having an excessively pungent odor, a very caustic and alkaline taste, and a strongly alkaline reaction upon red litmus paper.

Specific gravity: 0.897 at 25° C. (77° F.).

If Stronger Ammonia Water be diluted with twice its volume of distilled water, it should respond to the reactions and tests described under *Aqua Ammoniæ*.

The percentage of ammonia gas in Stronger Ammonia Water should be determined by the same test as that given under *Aqua Ammoniæ*.

AQUA AMYGDALÆ AMARÆ

Bitter Almond Water

Oil of Bitter Almond, *one cubic centimeter*	1 Cc.
Distilled Water, *nine hundred and ninety-nine cubic centimeters* .	999 Cc.
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Oil in the Distilled Water by agitation, and filter through a well-wetted filter.

Average dose.—4 Cc. (1 fluidrachm).

AQUA ANISI

Anise Water

Oil of Anise, *two cubic centimeters*	2 Cc.
Purified Talc, *fifteen grammes*	15 Gm
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Triturate the Oil of Anise with the Purified Talc, add the Distilled Water gradually with continued trituration, filter, and pass the filtrate through the filter repeatedly until the Anise Water is perfectly clear.

Average dose.— 16 Cc. (4 fluidrachms).

AQUA AURANTII FLORUM

Orange Flower Water

Stronger Orange Flower Water,
Distilled Water, each, *one volume.*

Mix them immediately before use.

Average dose.— 16 Cc. (4 fluidrachms).

AQUA AURANTII FLORUM FORTIOR

Stronger Orange Flower Water

Water saturated with the volatile oil of fresh orange flowers obtained as a by-product in the distillation of the oil of orange flowers. It should be kept in bottles loosely stoppered with a pledget of purified cotton, and in a dark place.

Stronger Orange Flower Water should be neutral to litmus paper, and have a strong odor of fresh orange flowers.

It should be colorless and clear, or only faintly opalescent, not mucilaginous, and should give no reaction with hydrogen sulphide T.S. or ammonium sulphide T.S. (absence of *metallic impurities*).

Average dose.— 8 Cc. (2 fluidrachms).

AQUA CAMPHORÆ

Camphor Water

Camphor, *eight grammes*	8 Gm.
Alcohol, *eight cubic centimeters*	8 Cc.
Purified Talc, *fifteen grammes*	15 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Dissolve the Camphor in the Alcohol, triturate the solution with the Purified Talc, and, after allowing the greater part of the Alcohol to evaporate spontaneously, continue the trituration with the Water, gradually added; then pour the mixture upon a well-wetted filter, and pass the filtrate through the filter repeatedly until the Camphor Water is perfectly clear.

Average dose.—8 Cc. (2 fluidrachms).

AQUA CHLOROFORMI

Chloroform Water

Chloroform,
Distilled Water, each, *a sufficient quantity.*

Add enough Chloroform to a convenient quantity of Distilled Water, contained in a dark amber-colored bottle, to maintain a slight excess of the former after the contents have been repeatedly and thoroughly agitated.

When Chloroform Water is required for use pour off the needed quantity of the solution, refill the bottle with Distilled Water and saturate it by thorough agitation, taking care that there be always an excess of Chloroform present.

Average dose.—16 Cc. (4 fluidrachms).

AQUA CINNAMOMI

Cinnamon Water

Oil of Cinnamon, *two cubic centimeters*	2 Cc.
Purified Talc, *fifteen grammes*	15 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Triturate the Oil of Cinnamon with the Purified Talc, add the Distilled Water gradually with continued trituration, filter, and pass the filtrate through the filter repeatedly until the Cinnamon Water is perfectly clear.

Average dose.—16 Cc. (4 fluidrachms).

AQUA CREOSOTI

Creosote Water

Creosote, *ten cubic centimeters*	10 Cc.
Distilled Water, *nine hundred and ninety cubic centimeters* . .	990 Cc.
To make *one thousand cubic centimeters* . .	1000 Cc.

Agitate the Creosote vigorously with the Distilled Water, and filter through a well-wetted filter. Creosote Water should be freshly prepared when dispensed.

Average dose.— 8 Cc. (2 fluidrachms).

AQUA DESTILLATA

Distilled Water

Water, *one thousand volumes*	1000 Vol.
To make *eight hundred volumes*	800 Vol.

Distil the Water from a suitable apparatus provided with a block-tin or glass condenser. Collect the first *one hundred volumes*, and reject this portion. Then collect *eight hundred volumes* and keep the Distilled Water in glass-stoppered bottles, which have been rinsed with hot distilled water immediately before being filled.

A colorless, limpid liquid, without odor or taste, and perfectly neutral to litmus paper.

Distilled Water should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121), nor should the slightest turbidity result upon the addition to separate portions, of barium chloride T.S. (*sulphates*), silver nitrate T.S. (*chlorides*), ammonium oxalate T.S. (*calcium*) ; nor should its transparency be affected when mixed with twice its volume of calcium hydroxide T.S. (absence of *carbonic acid*).

It should give no reaction for nitrates, nitrites, or ammonia when tested as described under *Aqua*.

When 1000 Cc. of Distilled Water are evaporated on a water-bath to dryness, not more than 0.050 Gm. of *residue* should remain.

On heating to boiling 100 Cc. of Distilled Water, acidulated with 10 Cc. of diluted sulphuric acid, and subsequently adding 0.1 Cc. of tenth-normal potassium permanganate V.S., the color of the liquid should not be completely destroyed by boiling for ten minutes, nor should it wholly disappear if the vessel be afterwards set aside in a dark place, covered, for ten hours (absence of *organic or other oxidizable substances*).

AQUA FŒNICULI

Fennel Water

Oil of Fennel, *two cubic centimeters*	2 Cc.
Purified Talc, *fifteen grammes*	15 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Triturate the Oil of Fennel with the Purified Talc, add the Distilled Water gradually with continued trituration, filter, and pass the filtrate through the filter repeatedly until the Fennel Water is perfectly clear.

Average dose.—16 Cc. (4 fluidrachms).

AQUA HAMAMELIDIS

Hamamelis Water

Hamamelis Bark, *ten thousand grammes*	10000 Gm.
Water, *twenty thousand cubic centimeters*	20000 Cc.
Alcohol, *fifteen hundred cubic centimeters*	1500 Cc.
To make *ten thousand cubic centimeters*	10000 Cc.

Macerate the Hamamelis Bark in the Water during twenty-four hours; then distil until *eighty-five hundred cubic centimeters* of distillate are obtained, add the Alcohol, and mix thoroughly.

If 1 Cc. of Hamamelis Water be added to 5 Cc. of sulphuric acid containing a little salicylic acid in solution, no red color should appear (absence of *formaldehyde*).

Average dose.—8 Cc. (2 fluidrachms).

AQUA HYDROGENII DIOXIDI

Solution of Hydrogen Dioxide

A slightly acid, aqueous solution of Hydrogen Dioxide [$H_2O_2 =$ 33.76], which should contain, when freshly prepared, about 3 percent., by weight, of absolute Hydrogen Dioxide, corresponding to about 10 volumes of available oxygen. It should be kept in a cool place. Upon removing the stopper from the bottle not more than a slight pressure should be observed.

A colorless liquid, without odor, slightly acidulous to the taste, and producing a peculiar sensation and soapy froth in the mouth; liable to deteriorate upon keeping or protracted agitation. If the stopper in the bottle be replaced by a pledget of cotton, deterioration is retarded.

When exposed to the air at the ordinary temperature, or when heated on a water-bath at a temperature not exceeding 60° C. (140° F.), the solution loses chiefly water. When rapidly heated, it frequently decomposes suddenly.

On adding to 10 Cc. of water, in a test-tube, 1 drop of potassium chromate T.S., then 10 drops of diluted sulphuric acid, and pouring a few Cc. of ether on top, the subsequent addition of a few drops of Solution of Hydrogen Dioxide, even when considerably diluted, will cause a blue color to appear at the zone of contact of the two liquids. After shaking, the ether-layer will separate with a blue color.

If to 25 Cc. of the Solution, 5 Cc. of tenth-normal potassium hydroxide V.S. be added, and the mixture be evaporated to about 10 Cc., and 3 drops of phenolphthalein T.S. added, not less than 2.5 Cc. of tenth-normal sulphuric acid V.S. should be required to discharge the red color of the solution after continued boiling (limit of *free acids*).

If 20 Cc. of the Solution be evaporated to dryness upon a water-bath, and the drying completed at 120° C. (248° F.), not more than 0.03 Gm. of solid residue should remain (limit of *total solids*).

If to 1 Cc. of the Solution, 1 Cc. of ammonia water be added, and the liquid evaporated to dryness upon a water-bath, the residue should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 1 Cc. of the Solution be evaporated to dryness upon a water-bath, the residue, when dissolved in 10 Cc. of distilled water containing 1 Cc. of diluted hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

On evaporating to dryness, upon a water-bath, 50 Cc. of the Solution, previously rendered alkaline by sodium hydroxide T.S., transferring the dry residue to a watch-glass, moistening it with sulphuric acid, and setting the glass in a moderately warm place for a few hours, the surface of the glass, after being washed, should exhibit no sign of corrosion (absence of *hydrofluoric acid*).

The addition of a few drops of diluted sulphuric acid to 10 Cc. of the Solution should produce no turbidity or precipitate (absence of *barium*).

Assay of Solution of Hydrogen Dioxide

Dilute 10 Cc. of the Solution with sufficient distilled water to measure 100 Cc. Transfer 16.9 Cc. of this liquid (containing 1.69 Cc. of the Solution) to a beaker, add 5 Cc. of diluted sulphuric acid, and then, from a burette, slowly add, with constant stirring, tenth-normal potassium permanganate V.S. until the liquid just retains a faint pink tint. Each Cc. of tenth-normal potassium permanganate V.S. consumed corresponds to 0.1 percent. of absolute Hydrogen Dioxide, or 0.329 volumes of oxygen. If the Solution be of full strength, 30 Cc. of tenth-normal potassium permanganate V.S. will be required.

Average dose.—4 Cc. (1 fluidrachm).

AQUA MENTHÆ PIPERITÆ

Peppermint Water

Oil of Peppermint, *two cubic centimeters*	2 Cc.
Purified Talc, *fifteen grammes*	15 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Triturate the Oil of Peppermint with the Purified Talc, add the Distilled Water gradually with continued trituration, filter, and pass the filtrate through the filter repeatedly until the Peppermint Water is perfectly clear.

Average dose.— 16 Cc. (4 fluidrachms).

AQUA MENTHÆ VIRIDIS

Spearmint Water

Oil of Spearmint, *two cubic centimeters*	2 Cc.
Purified Talc, *fifteen grammes*	15 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Triturate the Oil of Spearmint with the Purified Talc, add the Distilled Water gradually with continued trituration, filter, and pass the filtrate through the filter repeatedly until the Spearmint Water is perfectly clear.

Average dose.— 16 Cc. (4 fluidrachms).

AQUA ROSÆ

Rose Water

Stronger Rose Water,
Distilled Water, each, *one volume.*

Mix them immediately before use.

Average dose.— 16 Cc. (4 fluidrachms).

AQUA ROSÆ FORTIOR

Stronger Rose Water

Water saturated with the volatile oil of rose petals, obtained by distillation.

Stronger Rose Water should be kept in bottles loosely stoppered with a pledget of purified cotton, and in a dark place.

Stronger Rose Water should be colorless and clear, not mucilaginous, and should have the odor of roses, free from empyreuma. It should give no reaction with hydrogen sulphide T.S. or ammonium sulphide T.S. (absence of *metallic impurities*).

Average dose.— 8 Cc. (2 fluidrachms).

ARGENTI CYANIDUM

Silver Cyanide

$AgCN = 132.96$

It should contain not less than 99.9 percent. of pure Silver Cyanide, corresponding to 80.48 percent. of metallic silver. It should be kept in dark amber-colored vials, protected from light.

A white powder, without odor or taste, permanent in dry air, but gradually turning brown on exposure to light.

Insoluble in water, alcohol, or cold nitric acid, but soluble in boiling nitric acid with evolution of hydrocyanic acid ; also soluble in ammonia water, sodium thiosulphate T.S., and potassium cyanide T.S.

When heated in a porcelain crucible the salt fuses, gives off cyanogen gas, and, on ignition, leaves a residue of metallic silver amounting to 80.48 percent. of its original weight.

ARGENTI NITRAS

Silver Nitrate

$AgNO_3 = 168.69$

It should contain not less than 99.9 percent. of pure Silver Nitrate, and should be kept in dark amber-colored vials, protected from light.

Colorless, transparent, tabular, rhombic crystals, becoming gray or grayish-black on exposure to light in the presence of organic matter; without odor, but having a bitter, caustic, and strongly metallic taste.

Soluble in 0.54 part of water, and in 24 parts of alcohol at 25° C. (77° F.); in 0.1 part of boiling water, and in 5 parts of boiling alcohol.

When heated in a porcelain crucible to about 200° C. (392° F.), the salt melts, forming a faintly yellow liquid, which, on cooling, congeals to a pure white, crystalline mass. At a higher temperature it is gradually decomposed with evolution of nitrous vapors.

An aqueous solution of the salt is neutral to litmus paper, and yields, with hydrochloric acid, a white precipitate, which is readily dissolved by ammonia water, the liquid not acquiring a blue color (absence of *copper*).

If 5 Cc. of an aqueous solution of the salt (1 in 10) be mixed with 20 Cc. of hot diluted sulphuric acid, and heated to boiling, no turbidity should be perceptible, and upon standing, no white precipitate should be deposited (absence of *lead*).

If a portion of an aqueous solution (1 in 10) be completely precipitated by hydrochloric acid, filtered, and the filtrate evaporated to dryness, not more than 0.1 percent. of residue should remain (limit of *foreign salts*).

If 0.5 Gm. of Silver Nitrate, dissolved in 10 Cc. of distilled water, be well mixed with 30 Cc. of tenth-normal sodium chloride V.S. and 3 drops of potassium chromate T.S., not more than 0.4 Cc. of tenth-normal silver nitrate V.S. should be required to impart to the liquid a permanent red color.

Average dose.—0.010 Gm. = 10 milligrammes ($\frac{1}{6}$ grain).

ARGENTI NITRAS FUSUS

Moulded Silver Nitrate

It should contain not less than 94.8 percent. of pure Silver Nitrate.

Silver Nitrate, *one hundred grammes*	100 Gm.
Hydrochloric Acid, *four grammes*	4 Gm.

To the Silver Nitrate, contained in a porcelain dish, add the Hydrochloric Acid, and melt the mixture at as low a temperature as possible. Stir well, and pour the melted mass into suitable moulds. It should be kept in dark amber-colored vials, protected from light.

A white, hard solid, generally in the form of pencils or cones of a fibrous fracture, becoming gray or grayish-black on exposure to light in the presence of organic matter; odorless, and having a bitter, caustic, and strongly metallic taste.

Soluble, with the exception of about 5 percent. of silver chloride, in 0.54 part of water, and in 24 parts of alcohol at 25° C. (77° F.); in 0.1 part of boiling water, and in 5 parts of boiling alcohol. The portion left undissolved by water should be completely soluble in ammonia water.

A clear, aqueous solution of Moulded Silver Nitrate, decanted from the insoluble portion, should be neutral to litmus paper, and should respond to the tests of identity and purity stated under *Argenti Nitras*.

If 0.5 Gm. of Moulded Silver Nitrate, dissolved as completely as possible in 10 Cc. of water, be thoroughly mixed with 30 Cc. of tenth-normal sodium chloride V.S. and 3 drops of potassium chromate T.S., not more than 1.9 Cc. of tenth-normal silver nitrate V.S. should be required to impart to the liquid a permanent red color.

ARGENTI NITRAS MITIGATUS

Mitigated Silver Nitrate

[ARGENTI NITRAS DILUTUS, PHARM. 1890]

It should contain not less than 33.3 percent. of pure Silver Nitrate.

Silver Nitrate, *thirty grammes*	30 Gm.
Potassium Nitrate, *sixty grammes*	60 Gm.

Melt the salts together in a porcelain crucible, at as low a temperature as possible, stirring the melted mass well until it flows smoothly. Then pour it into suitable moulds. It should be kept in dark amber-colored vials, protected from light.

A white, hard solid, generally in the form of pencils or cones of a finely granular fracture, becoming gray or grayish-black on exposure to light in the presence of organic matter; odorless, and having a caustic, metallic taste.

Its aqueous solution is neutral to litmus paper.

Each of its constituents retains the solubility in water and in alcohol stated respectively under *Argenti Nitras* and *Potassii Nitras.*

An aqueous solution of Mitigated Silver Nitrate yields with a slight excess of hydrochloric acid a white precipitate, which is readily soluble in ammonia water. The filtrate from this precipitate, when evaporated to dryness, yields a white residue which is completely soluble in water, and this solution, when concentrated, affords a white, crystalline precipitate with sodium bitartrate T.S.

If 1 drop of diphenylamine T.S. be mixed with 5 Cc. of an aqueous solution of the salt in a test-tube, and sulphuric acid be carefully poured in, so as to form a separate layer, a blue color will appear at the line of contact.

If to an aqueous solution of Mitigated Silver Nitrate a slight excess of ammonia water be added, it should neither assume a blue color (absence of *copper*), nor show any turbidity (absence of *lead* and *bismuth*).

If 1 Gm. of Mitigated Silver Nitrate, dissolved in 10 Cc. of water, be well mixed with 20 Cc. of tenth-normal sodium chloride V.S. and 3 drops of potassium chromate T.S., not more than 0.3 Cc. of tenth-normal silver nitrate V.S. should be required to impart to the liquid a permanent red color.

ARGENTI OXIDUM

Silver Oxide

$Ag_2O = 230.12$

It should contain 99.8 percent. of pure Silver Oxide, corresponding to not less than 92.9 percent. of pure metallic silver, and should be kept in dark amber-colored vials. Silver Oxide should not be triturated with readily oxidizable or combustible substances, and should not be brought in contact with ammonia.

A heavy, dark brownish-black powder, liable to reduction by exposure to light, odorless, and having a metallic taste.

Very slightly soluble in water, to which it imparts an alkaline reaction; insoluble in alcohol; it is readily soluble in nitric acid without effervescence (absence of *carbonate*).

If 0.2 Gm. of the Oxide be dissolved in a mixture of 1 Cc. of nitric acid and 2 Cc. of distilled water, 10 Cc. of ammonia water added, and the liquid diluted to 60 Cc., then 10 Cc. of this solution should not immediately become cloudy upon the addition of 1 Cc. of nitric acid (limit of *chloride*).

When heated in a porcelain crucible to about 250° to 300° C. (482° to 572° F.), it is rapidly decomposed, with the evolution of oxygen, leaving a residue of metallic silver.

The solution of the Oxide in nitric acid should be colorless, and should respond to the reactions and tests stated under *Argenti Nitras*.

If 0.5 Gm. of the Oxide be ignited in a porcelain crucible, it should yield not less than 0.464 Gm. of pure metallic silver.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

ARNICA

Arnica

[ARNICÆ FLORES, PHARM. 1890]

The dried flower-heads of *Arnica montana* Linné (Fam. *Compositæ*).

Subglobular, about 2 Cm. long; involucre campanulate-turbinate; bracts in 1 to 2 ranks, oblong, dark green, pubescent; receptacle slightly convex, deeply pitted, densely short-hairy; rays about 16, bright yellow, the ligulate portion 2 to 2.5 Cm. long, nearly 6 Mm. broad, 3-toothed, 7- to 9-nerved, pistillate; disk flowers perfect, 5-toothed, of a deeper yellow, their akenes nearly 6 Mm. long, slender, tapering sharply to the base, flattened, 5-ribbed, pubescent, the pappus nearly a half longer than the akene, of a single circle of nearly white barbellate bristles; odor characteristic and agreeable; taste bitter.

Average dose.—1 Gm. (15 grains).

ARSENI IODIDUM

Arsenous Iodide

$AsI_3 = 452.10$

It should contain not less than 82.7 percent. of iodine, and 16.3 percent. of metallic arsenic. Arsenous Iodide should be kept in amber-colored, glass-stoppered vials, in a cool place, protected from the light.

An orange-red, inodorous, crystalline powder, stable when protected from direct sunlight and kept in a cool place.

Soluble, with partial decomposition, in about 12 parts of water, and in about 28 parts of alcohol at 25° C. (77° F.); completely soluble in chloroform, carbon disulphide, or ether.

No loss of iodine occurs when Arsenous Iodide is heated upon a water-bath, but at higher temperatures it completely volatilizes. When warmed with a few drops of nitric acid, brown vapors of nitrous oxide are evolved, followed by violet vapors of iodine.

The aqueous solution should be colorless to yellow, and upon standing gradu-
lecomposes into arsenous and hydriodic acids.

ydrogen sulphide T.S. be added to an aqueous solution of Arsenous
acidulated with hydrochloric acid, a lemon-yellow precipitate of arse-
lphide is produced.

If 0.5 Gm. of Arsenous Iodide and 2 Gm. of sodium bicarbonate be dissolved in 50 Cc. of water, not less than 21.9 Cc. of tenth-normal iodine V.S. should be required to impart a slight yellow tint to the solution.

Average dose.—0.005 Gm. = 5 milligrammes ($\frac{1}{10}$ grain).

ARSENI TRIOXIDUM

Arsenic Trioxide

$As_2O_3 = 196.44$

[ACIDUM ARSENOSUM, PHARM. 1890.]

It should contain not less than 99.8 percent. of pure Arsenic Trioxide.

A heavy solid occurring either as an opaque, white powder, or in irregular masses of two varieties: one, amorphous, transparent, and colorless, like glass; the other, crystalline, opaque, and white, resembling porcelain. Frequently the same piece has an opaque, white, outer crust enclosing the glassy variety. Contact with moist air gradually changes the glassy into the white, opaque variety. Both are odorless and tasteless.

In cold water both varieties dissolve very slowly, the degree of solubility varying according to conditions and time, the glassy variety requiring about 30, the porcelain-like or crystalline powder about 100 parts of water at 25° C. (77° F.). Both are slowly but completely soluble in 15 parts of boiling water. In alcohol, Arsenic Trioxide is but sparingly soluble, but it is soluble in about 5 parts of glycerin. Oil of turpentine dissolves only the glassy variety. Both varieties are freely soluble in hydrochloric acid, and in solutions of alkali hydroxides and carbonates.

When slowly heated in a test-tube, Arsenic Trioxide yields a sublimate of minute, brilliant, transparent, octahedral crystals. When heated rapidly to about 200° C. (392° F.), the amorphous variety fuses, then sublimes, while the crystalline variety sublimes without fusing; no residue should remain after sublimation. When covered with charcoal in an ignition-tube, and strongly heated, Arsenic Trioxide is deoxidized, and metallic arsenic is deposited on the cooler portion of the tube as a mirror having a metallic lustre.

Cupric ammonium sulphate T.S. produces in an aqueous solution a bright green precipitate.

If the green precipitate be dissolved in ammonia water, a deep blue-colored solution should be produced.

An aqueous solution of Arsenic Trioxide has a faintly acid reaction upon blue litmus paper.

Silver ammonium nitrate T.S. produces in an aqueous solution a lemon-yellow precipitate, which dissolves on the addition of ammonia water; when this solution is heated, metallic silver is deposited (distinction from *arsenic acid*).

Hydrogen sulphide T.S. colors a solution of Arsenic Trioxide yellow; if a few drops of hydrochloric acid be added, it precipitates lemon-yellow arsenic trisulphide, which should be completely soluble in ammonium carbonate T.S. (absence of *antimony, tin,* and *cadmium*).

When Arsenic Trioxide is carefully heated in a dry test-tube of hard glass, it should sublime without leaving a residue, and the sublimate should not at first show a yellow color (absence of *non-volatile matter* and of *arsenous sulphide*).

If 1 Gm. of Arsenic Trioxide be dissolved in 10 Cc. of ammonia water, with the aid of a gentle heat, a colorless solution should be produced.

If 0.1 Gm. of Arsenic Trioxide be dissolved, together with 1 Gm. of sodium bicarbonate, in 20 Cc. of water, by the aid of a gentle heat, it should decolorize

not less than 20.3 (20.32) Cc. of tenth-normal iodine V.S. (corresponding to at least 99.8 percent. of pure Arsenic Trioxide).

Average dose.— 0.002 Gm. = 2 milligrammes ($\frac{1}{30}$ grain).

ASAFŒTIDA

Asafetida

A gum-resin obtained from the root of *Ferula fœtida* (Bunge) Regel, and probably other species of *Ferula* (Fam. *Umbelliferæ*).

In irregular masses composed of tears of variable size embedded in a yellowish-brown or reddish-brown matrix; when fresh, the tears are tough, yellowish-white and translucent, or milky-white and opaque, changing gradually on exposure to pinkish and finally reddish-brown; the freshly fractured surface becomes greenish on the application of a few drops of a 40 percent. nitric acid solution; becoming hard and brittle by drying; odor persistent, alliaceous; taste bitter, alliaceous, and acrid.

When triturated with water, Asafetida yields a milk-white emulsion which becomes yellowish on the addition of ammonia water. Not less than 50 percent. should dissolve in alcohol. When incinerated, Asafetida should yield not more than 15 percent. of ash.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

ASPIDIUM

Aspidium

The dried rhizome of *Dryopteris Filix-mas* (Linné) Schott, or of *Dryopteris marginalis* (Linné) Asa Gray (Fam. *Filices*).

Before being peeled, 10 to 15 Cm. long by 5 to 7 Cm. thick, including the densely imbricated, dark brown, cylindraceous, slightly curved stipe-bases and the dense mass of brownish, glossy, transparent, soft, chaffy scales; when peeled, 1 to 2 or 3 Cm. thick, cylindraceous and nearly straight, or curved and tapering towards one end, roughly scarred with remains of the stipe-bases, or bearing several coarse longitudinal ridges and grooves; pale green when first peeled, becoming pale brown; fracture sharp, pale green, the texture rather spongy, exhibiting from 6 to 10 steles in a loose and interrupted circle; odor disagreeable; taste bitter-sweet, astringent, acrid, and nauseous.

The chaff, together with the dead portions of the rhizome and stipes, should be removed, and only such portions used as have retained their internal green color. Powdered Aspidium should be freshly prepared and have a bright green color.

Average dose.— 4 Gm. (60 grains).

ATROPINA

Atropine

$C_{17}H_{23}NO_3 = 287.04$

An alkaloid obtained from *Atropa Belladonna* Linné (Fam. *Solanaceæ*) and from other plants of the same family. As it occurs in commerce, it is usually accompanied by a small amount of hyoscyamine, from which it cannot be readily separated. It should be kept in amber-colored, well-stoppered vials.

White rhombic prisms, more or less elongated in the direction of the major axis as they contain more or less hyoscyamine; odorless; possessing a bitter, acrid taste (*it should be tasted with the utmost caution and only in dilute solution*).

Atropine shows an alkaline reaction with litmus, phenolphthalein, and hematoxylin T.S.

Atropine chloraurate may be made by adding gold chloride T.S. to a solution of Atropine in diluted hydrochloric acid, washing, collecting, and drying the precipitate.

Pure atropine chloraurate melts at 136° C. (276.8° F.).

Pure hyoscyamine chloraurate melts at 160° C. (320° F.).

Pure hyoscine chloraurate melts at 197° C. (386.6° F.). Atropine chloraurate alone melts under boiling water.

At about 113.8° C. (237° F.) Atropine melts, forming a colorless liquid; the melting point of Atropine free from hyoscyamine is about 115.8° C. (240.4° F.). When ignited, it is consumed without leaving a residue.

Soluble in 450 parts of water, 1.46 parts of alcohol, 16.6 parts of ether, and 1.56 parts of chloroform at 25° C. (77° F.); soluble in 86.7 parts of water at 80° C. (176° F.), and in 0.9 part of alcohol at 60° C. (140° F.).

On adding sulphuric acid to Atropine, no color should be produced (absence of *readily carbonizable organic impurities*), nor should any color be developed upon the subsequent addition of nitric acid (absence of, and difference from, *morphine*).

In a solution of Atropine in hydrochloric acid, platinic chloride T.S. produces no precipitate (difference from *most other alkaloids*). Gold chloride T.S. yields a yellow, lustreless precipitate in such a solution.

If a few crystals of Atropine be placed in a porcelain dish on a water-bath with a few drops of nitric acid, and heated to dryness, a yellow residue will be produced; if on cooling a few drops of alcoholic potassium hydroxide T.S. and a fragment of potassium hydroxide be added, an intense violet color is produced; hyoscyamine and hyoscine will produce the same color, but the presence of strychnine masks the reaction.

If a crystal of Atropine be added to a few drops of sulphuric acid containing 1 drop of creosol, a pink color should be produced, which is not dissipated by the addition of 0.5 Gm. of hydrated chloral (distinction from *other alkaloids*, *hyoscyamine* producing a brown color and *strychnine* a black, *hyoscine* remaining colorless).

If a small quantity of Atropine, or one of its salts, be heated with a few Cc. of sulphuric acid, a peculiar odor, recalling that of a mixture of rose, orange flower, and melilot, will become noticeable. The addition of a few fragments of potassium dichromate will change this odor to that of bitter almond.

Average dose.— 0.0004 Gm. = 0.4 milligramme ($\frac{1}{160}$ grain).

ATROPINÆ SULPHAS

Atropine Sulphate

$(C_{17}H_{23}NO_3)_2.H_2SO_4 = 671.43$

The sulphate $[SO_2(OH)_2.(C_{17}H_{23}NO_3)_2]$ of an alkaloid obtained from *Atropa Belladonna* Linné (Fam. *Solanaceæ*), and from other plants of the same family. As it occurs in commerce, it usually contains a

small amount of hyoscyamine sulphate, from which it cannot be readily separated.

A white crystalline powder or microscopical needles and prisms (the form of the latter being probably due to the hyoscyamine present); odorless, having a very bitter, nauseating taste, and permanent in the air. *It should be tasted with the utmost caution, and only in dilute solution.*

Soluble in 0.38 part of water, 3.7 parts of alcohol, 2140 parts of ether, and in 620 parts of chloroform at 25° C. (77° F.); soluble in 0.22 part of water at 80° C. (176° F.), and in 1.9 parts of alcohol at 60° C. (140° F.).

At about 189.9° C. (373.8° F.) Atropine Sulphate melts; when free from hyoscyamine it melts at about 188° C. (370.4° F.). When ignited it chars, emits acrid vapors, and is rapidly and completely consumed.

On adding potassium hydroxide T.S. to a solution of Atropine Sulphate, a white precipitate of atropine is obtained, which should respond to the reactions and tests given under *Atropina.*

Average dose.—0.0004 Gm. = 0.4 milligramme ($\frac{1}{160}$ grain).

AURANTII AMARI CORTEX

Bitter Orange Peel

The dried rind of the unripe fruit of *Citrus vulgaris* Risso (Fam. *Rutaceæ*).

In narrow, thin bands, or in quarters; epidermis of a brownish-green color; outer layer with numerous oil reservoirs; inner layer spongy, light yellowish-brown; odor fragrant; taste aromatic and bitter.

Average dose.—1 Gm. (15 grains).

AURANTII DULCIS CORTEX

Sweet Orange Peel

The recently separated outer rind of the ripe fruit of *Citrus Aurantium* Linné (Fam. *Rutaceæ*).

Outer surface orange-yellow, with numerous oil reservoirs; odor highly fragrant; taste pungently aromatic.

Average dose.—1 Gm. (15 grains).

AURI ET SODII CHLORIDUM

Gold and Sodium Chloride

A mixture of equal parts, by weight, of anhydrous Gold Chloride [$AuCl_3 = 301.24$] and anhydrous Sodium Chloride [$NaCl = 58.06$], representing not less than 30 percent. of metallic gold. It should be kept in well-stoppered, amber-colored vials.

An orange-yellow powder, odorless, having a saline and metallic taste, and deliquescent when exposed to damp air.

The compound is very soluble in water, and at least one-half of it should be soluble in cold alcohol.

When exposed to a red heat, it is decomposed, and metallic gold is separated.

A fragment of the compound imparts a persistent, intensely yellow color to a non-luminous flame.

Its aqueous solution has a slightly acid reaction, and yields with silver nitrate T.S. a white precipitate insoluble in nitric acid and soluble in ammonia water.

On bringing a glass rod moistened with ammonia water close to a portion of Gold and Sodium Chloride, no white fumes should make their appearance (absence of *free hydrochloric acid*).

If 0.5 Gm. of Gold and Sodium Chloride be dissolved in 25 Cc. of water, in a porcelain dish, the solution made alkaline by the addition of 5 Cc. of potassium hydroxide T.S., and, after the addition of 5 Cc. of solution of hydrogen dioxide, heated for about one hour on a water-bath, a precipitate of metallic gold will be obtained, which, when washed with water slightly acidulated with hydrochloric acid, dried, and ignited, should weigh not less than 0.15 Gm. (corresponding to at least 30 percent. of metallic gold).

The filtrate from the precipitated gold should not be affected by hydrogen sulphide T.S., nor, after being supersaturated with ammonia water, by ammonium sulphide T.S. (absence of *metallic impurities*).

Average dose.— 0.005 Gm. = 5 milligrammes ($\frac{1}{10}$ grain).

BALSAMUM PERUVIANUM

Balsam of Peru

A balsam obtained from *Toluifera Pereiræ* (Royle) Baillon (Fam. *Leguminosæ*).

A viscid liquid of a dark brown color; free from stringiness or stickiness; transparent and reddish-brown in thin layers; of an agreeable vanilla-like odor and a bitter, acrid taste, with a persistent after-taste. When swallowed, it leaves a burning sensation in the throat. It does not harden on exposure to the air.

Specific gravity: 1.140 to 1.150 at 25° C. (77° F.).

Completely soluble in absolute alcohol, chloroform, and glacial acetic acid; only partially soluble in ether and petroleum benzin; soluble in 5 parts of alcohol, with not more than a slight opalescence. Water, when agitated with the Balsam, shows an acid reaction to blue litmus paper.

If 10 drops of the Balsam be triturated with 20 drops of sulphuric acid, a tough, homogeneous, brownish-red mass should result, which, when washed with cold water, should develop a violet color upon its surface, and, when drained, be converted into a brittle resinous mass (absence of *fixed oils*).

If 1 Gm. of the Balsam be shaken with 5 Cc. of petroleum benzin, the mixture warmed on a water-bath for ten minutes, and a sufficient quantity of the solvent added to replace loss by evaporation, then if 2 Cc. of the benzin solution be evaporated, and treated with a drop of nitric acid (sp. gr. 1.42), a permanent green or bluish-green color should not be produced (absence of *rosin*).

The remaining 3 Cc. of the benzin solution when shaken with an equal volume of an aqueous solution of copper acetate (1 in 1000) should not be colored green or bluish-green (absence of *rosin, turpentine, storax, fatty oils*, etc.).

On mixing the Balsam with half its volume of calcium hydroxide and heating for half an hour on a water-bath, a solid mass should not be formed (absence of *rosin, storax*, or *copaiba*).

If 1 Gm. of the Balsam be dissolved in 100 Cc. of alcohol and 1 Cc. of phenolphthalein T.S. be added, not more than 2 Cc. of half-normal alcoholic potassium hydroxide should be required to produce a pink color (limit of *acid resins*).

Mix 3 Gm. of the Balsam with 30 Cc. of sodium hydroxide T.S. and shake the mixture for a few minutes with 60 Gm. of ether. Transfer 51.5 Gm. of the ether-solution to a flask and evaporate to dryness. The residue, when dried to constant weight by a gentle heat, should weigh not less than 1.4 Gm. (presence of at least 56 percent. of *cinnamein*). If this residue be dissolved in 25 Cc.

of alcohol, then mixed with 25 Cc. of half-normal alcoholic potassium hydroxide V.S., and heated carefully during half an hour on a water-bath, it should require not more than 13.2 Cc. of half-normal hydrochloric acid V.S. to exactly neutralize the liquid, 1 Cc. of phenolphthalein T.S. being used as indicator.

Average dose.—1 Gm. (15 grains).

BALSAMUM TOLUTANUM

Balsam of Tolu

A balsam obtained from *Toluifera Balsamum* Linné (Fam. *Leguminosæ*).

A yellowish-brown, plastic solid, becoming brittle when old, dried, or exposed to cold. It is transparent in thin layers, has a pleasant, aromatic odor, recalling that of vanilla, and a mild, aromatic taste.

Readily soluble in alcohol, the solution showing an acid reaction to blue litmus paper; also soluble in chloroform and the solutions of the fixed alkalies; almost completely soluble in ether, but nearly insoluble in water and petroleum benzin; partially soluble in carbon disulphide.

If 0.5 Gm. of the Balsam be shaken with 25 Cc. of carbon disulphide and allowed to stand for thirty minutes, and the liquid then filtered, the residue obtained by evaporating the filtrate to dryness, when dissolved in glacial acetic acid, should not yield a green color on the addition of a few drops of sulphuric acid (absence of *rosin*).

If 1 Gm. of the Balsam be shaken with 8 Cc. of petroleum benzin for five minutes, the supernatant liquid should not be colored green when shaken with an equal volume of an aqueous solution of copper acetate (1 in 1000) (absence of *rosin* and *copaiba*).

If to 1 Gm. of the Balsam dissolved in 50 Cc. of alcohol, 1 Cc. of phenolphthalein T.S. be added, not less than 4 Cc. nor more than 6 Cc. of half-normal alcoholic potassium hydroxide V.S. should be required to produce a red color (limit of *acidity*); if to this liquid more half-normal alcoholic potassium hydroxide V.S. be added, until the total amount has reached exactly 20 Cc., and the liquid heated in a water-bath for half an hour, and allowed to cool, then not less than 13.2 Cc. nor more than 14.5 Cc. of half-normal sulphuric acid V.S. should be required to neutralize the excess of potassium hydroxide V.S., phenolphthalein T.S. being used as indicator (limit of *saponifiable substances*).

Average dose.—1 Gm. (15 grains).

BELLADONNÆ FOLIA

Belladonna Leaves

The dried leaves of *Atropa Belladonna* Linné (Fam. *Solanaceæ*), yielding, when assayed by the process given below, not less than 0.3 percent. of mydriatic alkaloids.

Usually of a dull brownish-green color, the leaves much wrinkled and matted together, frequently with the flowering tops intermixed; leaves from 6 to 20 Cm. long, 4 to 12 Cm. broad, broadly ovate, apex acute, margin entire, narrowed into the petiole, upper surface brownish-green, lower surface grayish-green, epidermis more or less papillose, particularly on the under surface; odor distinctly narcotic, especially on moistening; taste somewhat bitter and acrid.

The powder is characterized by few hairs and numerous, small, arrow-shaped crystals of calcium oxalate.

Assay of Belladonna Leaves

Belladonna Leaves, in No. 60 powder, *ten grammes* . . . . . 10 Gm.
Chloroform,
Ether,
Normal Sulphuric Acid V.S.,
Ammonia Water,
Distilled Water,
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Cochineal T.S., or **Iodeosin T.S.**, each, *a sufficient quantity.*

Place the Belladonna Leaves in an Erlenmeyer flask, and add 50 Cc. of a mixture of chloroform 1 part and ether 4 parts (both by volume). After inserting the stopper securely allow the flask to stand ten minutes, then add 2 Cc. of ammonia water mixed with 3 Cc. of distilled water, and shake the flask well at frequent intervals during one hour. Then transfer as much as possible of the contents of the flask to a small percolator which has been provided with a pledget of cotton packed firmly in the neck and inserted in a separator containing 6 Cc. of normal sulphuric acid V.S. diluted with 20 Cc. of distilled water. When the liquid has passed through the cotton, pack the Belladonna Leaves firmly in the percolator with the aid of a glass rod, and having rinsed the flask with 10 Cc. of the chloroform-ether mixture, transfer the remaining contents of the flask to the percolator, by the aid of several small portions (5 Cc.) of the chloroform-ether mixture, and continue the percolation with successive small portions of the same liquid (using in all 50 Cc.). Next, shake the separator well for one minute, after securely inserting the stopper, and when the liquids have completely separated, draw off the acid solution into another separator. Add to the chloroform-ether mixture 10 Cc. of sulphuric acid mixture of the same strength as that previously used, agitate well, and again draw off the acid solution into the second separator; repeat this operation once more, drawing off the acid solution as before; introduce into the acid solutions contained in the second separator a small piece of red litmus paper, then add ammonia water until the liquid is distinctly alkaline, and shake out with three successive portions of chloroform 15, 15, and 5 Cc.; collect the chloroform solutions in a beaker, place it on a water-bath containing warm water, and allow the chloroform to entirely evaporate. Dissolve the residue in 3 Cc. of ether, and let this also evaporate completely. To the alkaloidal residue add 3 Cc. of tenth-normal sulphuric acid V.S. and 5 drops of cochineal T.S. (or iodeosin T.S.), then titrate the excess of acid with fiftieth-normal potassium hydroxide V.S. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from 3 (the 3 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.0287 and this product by 10; the result will be the percentage of total mydriatic alkaloids contained in the Belladonna Leaves.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

BELLADONNÆ RADIX

Belladonna Root

The dried root of *Atropa Belladonna* Linné (Fam. *Solanaceæ*), yielding, when assayed as directed below, not less than 0.45 percent. of mydriatic alkaloids.

[illegible]

Assay of Belladonna Root

The method to be employed is identical with that given for Assay of the Belladonna Leaf, [illegible] Belladonna Root [illegible] powder.

Average dose.— [illegible]

BENZALDEHYDUM

Benzaldehyde

[illegible]

An aldehyde produced artificially or obtained from natural oil of bitter almond or other oils and containing not less than [illegible] per cent of pure Benzaldehyde [illegible]. It should be kept in small amber-coloured, well-stoppered bottles.

[illegible]

Assay of Benzaldehyde

[illegible]

sulphite (1 in 5), alternating with half-normal hydrochloric acid V.S. from a second burette, until 10 Cc. of the sodium sulphite solution have been added, and enough half-normal hydrochloric acid V.S. to maintain the neutrality of the mixture; after adding a few drops of rosolic acid T.S., and agitating the flask frequently, allow it to stand two hours to insure a permanent condition of neutrality, and then note the number of cubic centimeters of the half-normal hydrochloric acid V.S. used. Carry out a blank test, identical with the foregoing, except that the Benzaldehyde is omitted, and note the amount of half-normal hydrochloric acid V.S. consumed. Subtract the number of cubic centimeters required in the blank test from the number required in the original test; each Cc. of this difference corresponds to 0.0526 Gm. of Benzaldehyde. To find the percentage, multiply the above difference by 0.0526, and this product by 100, and divide by the weight of the Benzaldehyde taken.

Average dose.— 0.03 Cc. (½ minim).

BENZINUM

Petroleum Benzin

A distillate from American petroleum consisting of hydrocarbons, chiefly of the marsh-gas series [C_5H_{12}, C_6H_{14}, and homologous compounds]. It should be carefully kept in well-stoppered bottles or tin cans, in a cool place, remote from lights or fire.

A transparent, colorless, diffusive liquid, of a strong, characteristic odor, slightly resembling that of petroleum, but much less disagreeable, and having a neutral reaction. Petroleum benzin is highly inflammable, and its vapor, when mixed with air and ignited, explodes violently.

Specific gravity: 0.638 to 0.660 at 25° C. (77° F.).

Insoluble in water; soluble in about 6 parts of alcohol, and readily soluble in ether, chloroform, benzene, volatile oils, and fixed oils with the exception of castor oil.

Boiling point: 45° to 60° C. (113° to 140° F.).

If 5 drops of Petroleum Benzin be added to a mixture of 40 drops of sulphuric acid and 10 drops of nitric acid, in a test-tube, the liquid warmed for about ten minutes, and then set aside for half an hour, on diluting it, in a shallow dish, with water, it should not evolve the bitter-almond-like odor of nitro-benzene (difference from, and absence of, *benzene*).

BENZINUM PURIFICATUM

Purified Petroleum Benzin

Potassium Permanganate, *ten grammes*	10 Gm.
Sodium Hydroxide, *two grammes*	2 Gm.
Sulphuric Acid, *sixty cubic centimeters*	60 Cc.
Petroleum Benzin, *one thousand cubic centimeters*	1000 Cc.
Water, *a sufficient quantity.*	

Add the Acid to *five hundred and fifty cubic centimeters* of Water, and when the mixture has become cold, pour it into a bottle having the capacity of about two liters. Add *eight grammes* of Potassium Permanganate and agitate until it is dissolved, then add the Petroleum Benzin, in four portions, shaking the liquid after each addition. Allow the liquids to remain in contact for twenty-four hours, shaking the bottle at frequent intervals; then decant the Petroleum Benzin into another bottle of the same capacity, and having dissolved *two grammes* of Potassium Permanganate in *two hundred and forty cubic centimeters* of Water, in which the Sodium Hydroxide has previously been dissolved, mix the liquids and agitate the mixture frequently during several hours, then decant, repeat the washing with Water, and again decant the Purified Petroleum Benzin.

On evaporating 10 Cc. of Purified Petroleum Benzin from a piece of clean filtering paper, no greasy stain should remain, and the odor should not be disagreeable or notably sulphuretted; no residue should be left upon evaporating Purified Petroleum Benzin from a warmed dish (absence of *heavy hydrocarbons*).

When it is boiled for a few minutes with one-fourth its volume of spirit of ammonia and a few drops of silver nitrate T.S., the liquid should not turn brown (absence of *pyrogenous products and sulphur compounds*).

Purified Petroleum Benzin should have an ethereal or faint petroleum-like odor, and should respond to the tests given under *Benzinum*.

BENZOINUM

Benzoin

A balsamic resin obtained from *Styrax Benzoin* Dryander, and another unidentified species of *Styrax* (Fam. *Styraceæ*).

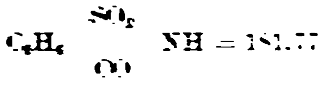
In pebble-like lumps or tears, mostly 0.5 to 5 Cm. long and about one-fourth as thick, slightly flattened, straight or curved, yellowish- to rusty-brown externally, milky-white on fresh fracture, separate or very slightly agglutinated (Siam Benzoin); or embedded in a dry resinous mass, which varies from reddish-brown to reddish-gray or grayish- or whitish-opaque or slightly translucent and more or less lustrous (Sumatra Benzoin); brittle, becoming soft on warming, and yielding benzoic acid on sublimation; odor agreeable, balsamic (vanilla-like in the Siam variety); taste slightly acrid.

Benzoin is almost wholly soluble in 5 parts of warm alcohol, the solution showing an acid reaction with blue litmus paper; soluble in solutions of sodium or potassium hydroxide. It should not, on incineration, yield more than 2 percent of ash.

Average dose.—1 Gm. (15 grains).

BENZOSULPHINIDUM

Benzosulphinide Saccharin



$$C_6H_4 \begin{matrix} SO_2 \\ \\ CO \end{matrix} NH = 181.77$$

The anhydride of ortho-sulphamide-benzoic acid (benzoyl sulphonic-imide).

A white, crystalline powder, nearly odorless, having an intensely sweet taste even in dilute solutions.

Soluble in 250 parts of water, and in 25 parts of alcohol, and but slightly soluble in ether or chloroform at 25° C. (77° F.); soluble in 24 parts of water at 100° C. (212° F.). It is easily soluble in ammonia water, in alkali hydroxide solutions, and in a solution of sodium bicarbonate, with the evolution of carbon dioxide.

Heated between 219° and 220° C. (426.2° and 428° F.) it melts, and at higher temperatures burns with an odor of oil of bitter almond, without leaving a weighable residue (absence of *inorganic impurities*).

If 0.2 Gm. of Benzosulphinide be dissolved with agitation in 10 Cc. of pure sulphuric acid, and the solution kept at a temperature of from 48° to 50° C. (118.4° to 122° F.), on a water-bath, it should not, within ten minutes, show a brown color (absence of *carbohydrates*).

If 0.2 Gm. of Benzosulphinide be dissolved in 5 Cc. of potassium hydroxide T.S., the solution should be clear, and not become colored, even on prolonged heating (absence of *glucose*).

A similar solution mixed with 5 Cc. of alkaline cupric tartrate V.S. should not, on heating, deposit any red cuprous oxide (absence of *glucose* or *milk-sugar*).

If to a hot aqueous solution of Benzosulphinide, ferric chloride T.S. be added, drop by drop, no precipitation or violet color should appear (absence of *benzoic* or *salicylic acids*).

Average dose.— 0.200 Gm. = 200 milligrammes (3 grains).

BERBERIS

Berberis

The rhizome and roots of *Berberis Aquifolium* Pursh, and other species of Berberis (Fam. *Berberidaceæ*).

In more or less knotty, irregular pieces of varying length and from 3 to 20 Mm. in diameter; bark from ½ to 2 Mm. thick; wood yellowish, distinctly radiate with narrow medullary rays, hard and tough; rhizome with a small pith; odor distinct; taste strongly bitter.

Pieces without the bark should be rejected.

Average dose.— 2 Gm. (30 grains).

BETANAPHTHOL

Betanaphthol

$C_{10}H_7OH = 142.98$

[NAPHTOL, PHARM. 1890]

A monatomic phenol occurring in coal-tar, but usually prepared from naphthalene. Betanaphthol should be kept in dark amber-colored, well-stoppered bottles.

Colorless or pale buff-colored, shining crystalline laminæ or a white or yellowish-white crystalline powder, having a faint phenol-like odor and a sharp and pungent but not persistent taste. Permanent in the air.

Soluble in about 950 parts of water, and in 0.61 part of alcohol at 25° C. (77° F.); in about 75 parts of boiling water, and very soluble in boiling alcohol; easily soluble in ether, chloroform, or solutions of alkali hydroxides.

Betanaphthol melts at 122° C. (251.6° F.) and boils at 286° C. (546.8° F.). It sublimes readily when heated; when in alcoholic or aqueous solution, it is volatilized with the vapor of alcohol or water. On ignition it leaves no residue.

It is neutral to litmus paper which has been moistened with alcohol.

A cold saturated aqueous solution of Betanaphthol when mixed with ammonia water exhibits a faint bluish fluorescence.

On adding about 0.1 Gm. of Betanaphthol to about 5 Cc. of an aqueous solution of potassium hydroxide (1 in 4), then about 1 Cc. of chloroform, and gently warming the mixture, the aqueous layer will acquire a blue tint, changing afterwards to green and brown.

Ferric chloride T.S. colors an aqueous solution greenish, and after some time causes the separation of white flakes, which turn brown upon the application of heat.

Betanaphthol should dissolve in 50 parts of ammonia water without leaving a residue (absence of *naphthalene*), and the solution should not have a deeper color than pale yellow (absence of *other organic impurities*).

An aqueous solution of Betanaphthol on the addition of chlorinated lime should show a pale yellow color and not a dark violet (distinction from, and absence of, *alphanaphthol*).

An aqueous solution of Betanaphthol on the addition of a few drops of iodine T.S., followed by sodium hydroxide T.S. in excess, should show no color (distinction from, and absence of, *alphanaphthol*, which produces an intensely violet color).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

BISMUTHI CITRAS

Bismuth Citrate

$BiC_6H_5O_7 = 394.52$

Bismuth Citrate should yield not less than 56 percent., nor more than 58 percent., of pure bismuth oxide.

Bismuth Subnitrate, *one hundred grammes*	100 Gm.
Citric Acid, *seventy-five grammes*	75 Gm.
Distilled Water, *a sufficient quantity.*	

Mix the Bismuth Subnitrate and the Citric Acid with *four hundred cubic centimeters* of Distilled Water, and heat on a bath of boiling water, with frequent stirring, until a drop of the mixture yields a clear solution with ammonia water. Then add *five thousand cubic centimeters* of Distilled Water, allow the suspended matter to deposit, wash the precipitate, first by decantation, and afterwards on a strainer, with Distilled Water, until the washings are tasteless, and dry the residue at a gentle heat.

A white, amorphous or micro-crystalline powder, odorless and tasteless.

Insoluble in water or alcohol, but soluble in ammonia water, and in solutions of alkali citrates.

When strongly heated the salt chars, and, on ignition, leaves a more or less blackened residue having a yellow surface, and soluble in warm nitric acid; this solution, when dropped into a large excess of water, occasions a white turbidity.

A solution of 1 Gm. of Bismuth Citrate in ammonia water, when treated with hydrogen sulphide in excess, yields a black precipitate.

If the filtrate from the latter be deprived by heat of the excess of hydrogen sulphide and cooled, a portion of it, boiled with an excess of lime water, yields a white precipitate.

If 0.01 Gm. of the salt be mixed with 1 Cc. of water, 5 Cc. of sulphuric acid added, the mixture cooled and then 5 Cc. of ferrous sulphate T.S. carefully poured over it, without mixing, no red or brown zone should appear within 5 minutes (limit of *nitrate*).

If 3 Gm. of the salt be ignited, the residue dissolved in just a sufficient quantity of warm nitric acid, and the solution poured into 100 Cc. of water, a white precipitate is produced. If the filtrate separated from this precipitate be evaporated on a water-bath to 30 Cc., the liquid again filtered, and the new filtrate divided into portions of 5 Cc. each, these should respond to the tests for purity described under *Bismuthi Subcarbonas* (absence of *lead, copper, silver, chlorides*, and *sulphates*).

Three Gm. of Bismuth Citrate, after ignition and treatment with nitric acid, as directed in the following test, should not respond to the Bettendorf's Test for *arsenic* (see Appendix, Test No. 16).

If 1 Gm. of Bismuth Citrate be thoroughly ignited in a porcelain crucible, and, after cooling, 5 Cc. of nitric acid be added to the residue, drop by drop, warming until complete solution is effected, then evaporating to dryness, and again igniting, a residue of bismuth oxide should be left weighing not less than 0.56 Gm. nor more than 0.58 Gm.

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

BISMUTHI ET AMMONII CITRAS

Bismuth and Ammonium Citrate

Bismuth and Ammonium Citrate should yield not less than 46 percent. nor more than 50 percent. of pure bismuth oxide.

Bismuth Citrate, *one hundred grammes*	100 Gm.
Ammonia Water,	
Distilled Water, each, *a sufficient quantity.*	

Mix the Bismuth Citrate with *two hundred cubic centimeters* of Distilled Water and rub it to a smooth paste, heat the mixture on a water-bath, and gradually add Ammonia Water until the salt is dissolved and the liquid is neutral or has only a faintly alkaline reaction. Then filter the solution, evaporate it on a water-bath to a syrupy consistence, and spread it upon plates of glass, so that, when dry, the salt may be obtained in scales. Keep the product in amber-colored, well-stoppered bottles, protected from light.

Shining, pearly or translucent scales, odorless, having a metallic taste, and becoming opaque with loss of ammonia on exposure to the air.

Very soluble in water, and sparingly soluble in alcohol.

When strongly heated the salt fuses, and finally leaves a blackened residue, having a yellow surface, and soluble in warm nitric acid. The acid solution, when dropped into a large excess of water, occasions a white turbidity.

The aqueous solution of the salt is neutral or faintly alkaline to litmus-paper. When boiled with a slight excess of sodium hydroxide T.S. it evolves ammonia, and its aqueous solution, when treated with hydrogen sulphide, yields a black precipitate.

If the filtrate from the latter be deprived by heat of the excess of hydrogen sulphide and cooled, a portion of it boiled with an excess of lime water, yields a white precipitate.

If [illegible] Gm. of the salt be dissolved in 1 Cc. of water, 5 Cc. of sulphuric acid added, the mixture cooled and then 5 Cc. of ferrous sulphate T.S. carefully poured upon it without mixing, no red or brown zone should appear within 5 minutes (limit of nitrate).

If 2 Gm. of the salt be ignited and the residue dissolved in just a sufficient quantity of warm nitric acid, and the solution poured into 100 Cc. of water, a white precipitate is produced. If the filtrate separated from this precipitate be evaporated on a water-bath to 20 Cc., the liquid again filtered and the new filtrate divided into portions of 5 Cc. each, these should respond to the tests for purity described under *Bismuthi Subnitras*.

Three grammes of Bismuth and Ammonium Citrate, after ignition and treatment with nitric acid, as directed in the following test, should not respond to Bettendorff's Test for arsenic (see Appendix, Test No. [illegible]).

If 1 Gm. of Bismuth and Ammonium Citrate be thoroughly ignited in a porcelain crucible and, after cooling, 5 Cc. of nitric acid be added to the residue [illegible] then evaporated [illegible] and again ignited, the residue of bismuth oxide should weigh not less than [illegible] Gm. nor more than [illegible] Gm.

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

BISMUTHI SUBCARBONAS

Bismuth Subcarbonate

Bismuth Subcarbonate should yield not less than 90 percent. of pure bismuth oxide.

A [illegible] pale yellowish-white powder, of somewhat varying chemical [illegible] and permanent in the air.

[illegible] completely soluble in nitric or hydrochloric acid [illegible]

[illegible] water and carbon dioxide, and should [illegible] of a yellow residue, which is soluble in nitric [illegible] hydrogen sulphide T.S.

[illegible] of diluted nitric acid be treated [illegible] silver nitrate V.S., and the precipitate, if any, [illegible] should remain unaffected by the further [illegible]

[illegible] in just a sufficient quantity (about 4 Cc.) of [illegible] into 100 Cc. of water, a white precipitate [illegible] After filtering and evaporating the filtrate on a water-bath [illegible] this filtrate into portions of 5 Cc. each, [illegible] tests:

[illegible] an equal volume of diluted sulphuric acid, it [illegible]

[illegible] with a slight excess of ammonia water, the [illegible]

[illegible] barium nitrate T.S. [illegible] is insoluble in a slight excess [illegible]

[illegible] of a mixture of equal parts of [illegible] and the filtrate freed [illegible] and again filtered, the last filtrate [illegible]

[illegible] of the salt [illegible] Cc. of potassium hydroxide T.S., it should not evolve the odor of ammonia.

If 0.05 Gm. of Bismuth Subcarbonate be agitated with 5 Cc. of a mixture of equal parts of water and ferrous sulphate T.S., and then cautiously poured over 5 Cc. of sulphuric acid (free from nitrous compounds), so as to form a layer above, no brownish-red zone should form at the line of contact of the two liquids (limit of *subnitrate*).

Two Gm. of Bismuth Subcarbonate should not respond to Bettendorf's Test for *arsenic* (see Appendix, Test No. 16).

If 1 Gm. of Bismuth Subcarbonate be thoroughly ignited at red heat in a porcelain crucible, the residue of bismuth oxide should weigh not less than 0.9 Gm.

Average dose.— **0.500 Gm. = 500 milligrammes (7½ grains).**

BISMUTHI SUBGALLAS

Bismuth Subgallate

Bismuth Subgallate should yield not less than 52 percent., nor more than 57 percent., of pure bismuth oxide.

An amorphous, bright yellow powder, somewhat variable in chemical composition, without odor or taste, and permanent in the air.

Insoluble in water, alcohol, and ether; readily soluble with decomposition in hydrochloric, nitric, and sulphuric acids, if these be heated; insoluble in very dilute mineral acids; readily soluble in solutions of the alkali hydroxides, forming a clear yellow-colored solution, which rapidly changes to a deep red.

When heated to 120° C. (248° F.) the salt loses from 5 to 7 percent. of water, and on subsequent heating to redness it at first chars, finally leaving a yellow residue, which is soluble in hydrochloric and nitric acids and is blackened by ammonium sulphide T.S.

Upon thoroughly agitating 0.1 Gm. of Bismuth Subgallate with an excess of hydrogen sulphide T.S., a black precipitate results; upon filtering and then boiling the filtrate to remove the dissolved gas, the cold filtrate, after the addition of 1 drop of ferric chloride T.S., will assume a blue-black coloration.

If 0.5 Gm. of the salt be well shaken with 5 Cc. of alcohol and filtered at once, the filtrate should not turn moistened blue litmus paper red (absence of *free gallic acid*).

If 0.5 Gm. of Bismuth Subgallate be well mixed with 5 Cc. of diluted sulphuric acid and 5 Cc. of ferrous sulphate T.S., the mixture filtered, and the filtrate cautiously poured, without shaking, over 5 Cc. of sulphuric acid (free from nitrous compounds) contained in a test-tube, no brown ring should form after standing for ten minutes (limit of *nitrate*).

If 3 Gm. of Bismuth Subgallate be ignited in a porcelain crucible, and, after cooling, nitric acid be cautiously added to the residue drop by drop, warming until it is dissolved, then evaporating to dryness and again igniting and cooling, the residue, after cautiously dissolving in nitric acid by the aid of gentle heat, should, after concentrating to about 4 Cc., be poured into 100 Cc. of water, and after filtering and evaporating the filtrate on a water-bath to 30 Cc., again filtering, and dividing this filtrate into portions of 5 Cc., then each of these should respond to the tests for purity described under *Bismuthi Subcarbonas.*

The residue resulting from the ignition and subsequent treatment of 2 Gm. of the salt, as described below, should not respond to Bettendorf's Test for *arsenic* (see Appendix, Test No. 16).

If 1 Gm. of Bismuth Subgallate be thoroughly ignited in a porcelain crucible, and, after cooling, 5 Cc. of nitric acid be added to the residue, drop by drop, warming until complete solution has been effected, this, upon evaporating to dryness and again igniting, should leave a residue of bismuth oxide weighing not less than 0.52 Gm. nor more than 0.57 Gm.

Average dose.— **0.250 Gm. = 250 milligrammes (4 grains).**

BISMUTHI SUBNITRAS

Bismuth Subnitrate

Bismuth Subnitrate should yield not less than 80 percent. of pure bismuth oxide.

A white powder, of somewhat varying chemical composition, odorless and almost tasteless, and permanent in the air.

Almost insoluble in water, and insoluble in alcohol, but readily soluble in nitric or hydrochloric acid.

When heated to 120° C. (248° F.) for twelve hours the salt loses not over 3 percent. of moisture; when subsequently heated to redness it evolves nitrous vapors, leaving not less than 80 percent. of its weight of a yellow residue, which is soluble in nitric or hydrochloric acid and blackened by hydrogen sulphide.

When brought in contact with moistened blue litmus paper the salt shows a slightly acid reaction.

On adding 3 Gm. of the salt to 3 Cc. of warm nitric acid no effervescence should occur (absence of *carbonate*), and no residue should be left (absence of *insoluble foreign salts*).

If this solution be poured into 100 Cc. of water, a white precipitate is produced.

If the filtrate separated from this precipitate be evaporated on a water-bath to 30 Cc., the liquid again filtered, and the new filtrate divided into portions of 5 Cc. each, these should respond to the tests for purity described under *Bismuthi Subcarbonas.*

On boiling 0.1 Gm. of the salt with 5 Cc. of potassium hydroxide T.S., no odor of ammonia should be perceptible.

If 2 Gm. of the salt be heated in a porcelain crucible until nitrous vapors cease to be evolved, the residue of bismuth oxide, when cold, should weigh not less than 1.6 Gm., and should not respond to Bettendorf's Test for *arsenic* (see Appendix, Test No. 16).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

BISMUTHI SUBSALICYLAS

Bismuth Subsalicylate

Bismuth Subsalicylate should yield not less than 62 nor more than 66 percent. of pure bismuth oxide.

A white, or nearly white, amorphous or crystalline powder, odorless, tasteless, and permanent in the air.

Almost insoluble in cold water; upon prolonged boiling with water a portion of the salicylic acid passes into solution with the formation of a more basic bismuth salicylate. It is partly soluble with decomposition in hydrochloric and nitric acids, a white, flocculent precipitate of salicylic acid separating.

When heated at 120° C. (248° F.) Bismuth Subsalicylate should not lose more than 1 percent. of water, and on subsequently heating to redness it at first chars, finally leaving a yellow residue, which is soluble in hydrochloric or nitric acid and is blackened by ammonium sulphide T.S.

When Bismuth Subsalicylate is agitated with a solution of 5 drops of ferric chloride T.S. in 10 Cc. of water, a deep violet-blue coloration is produced.

If 1 Gm. of Bismuth Subsalicylate be thoroughly agitated with 10 Cc. of diluted hydrochloric acid and filtered, the residue, after washing and drying, should conform to the reactions and tests given under *Acidum Salicylicum.*

Upon pouring the filtrate into an excess of water, a heavy white precipitate of basic bismuth chloride should be obtained.

If 1 Gm. of the salt be agitated with 5 Cc. of chloroform, and the liquid filtered through a double filter of fine texture into 5 Cc. of water containing 3 drops of ferric chloride T.S., no violet zone should form within one minute at the line of contact of the two liquids (limit of *free salicylic acid*).

If 3 Gm. of Bismuth Subsalicylate be ignited in a porcelain crucible, and, after cooling, nitric acid be cautiously added to the residue, solution should be complete if gently heated; if this solution, after concentrating to about 4 Cc., be poured into 100 Cc. of water, and after filtering and evaporating the filtrate on a water-bath to 30 Cc., again filtering, and dividing this filtrate into portions of 5 Cc., then each of these should respond to the tests for purity described under *Bismuthi Subcarbonas*.

If 0.05 Gm. of Bismuth Subsalicylate be triturated with 0.1 Gm. of sodium salicylate and 5 Cc. of distilled water, and carefully poured, without mixing, over 5 Cc. of sulphuric acid (free from nitrous compounds) contained in a test-tube, no pink to brownish-red zone should form immediately (limit of *nitrates*).

The residue resulting from the ignition and subsequent treatment of 2 Gm. of the salt, as described below, should not respond to Bettendorf's Test for *arsenic* (see Appendix, Test No. 16).

If 1 Gm. of Bismuth Subsalicylate, dried at 120° C. (248° F.), be thoroughly ignited in a porcelain crucible, and, after cooling, 5 Cc. of nitric acid be added to the residue, drop by drop, warming until complete solution has been effected, this, upon evaporating to dryness and again igniting, should leave a residue of bismuth oxide weighing not less than 0.62 Gm. nor more than 0.66 Gm.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

BROMOFORMUM

Bromoform

A liquid consisting of 99 percent., by weight, of absolute Bromoform [$CHBr_3 = 250.99$], and 1 percent. of absolute alcohol. It should be kept in dark amber-colored, glass-stoppered bottles, in a cool place, protected from light.

A heavy, transparent, colorless, mobile liquid, with an ethereal odor, and a penetrating, sweet taste resembling that of chloroform.

Specific gravity: 2.808 at 25° C. (77° F.).

Very slightly soluble in water, but soluble in all proportions in alcohol, ether, benzene, petroleum benzin, and in the fixed and volatile oils.

Bromoform is slightly volatile at ordinary temperatures, boils at 148° C. (298.4° F.), and solidifies at 6° C. (42.8° F.).

It is not inflammable, but when vaporized by the application of heat, its vapor may be burned.

If 10 Cc. of Bromoform be evaporated in a dish over a naked flame, no solid residue should remain.

If 10 Cc. of Bromoform be well shaken with 10 Cc. of distilled water, and the liquids, upon standing, be allowed to separate completely, the water removed from the layer of Bromoform should be neutral to blue litmus paper (absence of *free acid*), and a portion should not produce more than a slight turbidity when treated with silver nitrate T.S. (limit of *bromides* and *brominated compounds*), and another portion treated with potassium iodide T.S. should not be tinted blue upon the addition of starch T.S. (absence of *free bromine*).

If 10 Cc. of Bromoform be well shaken with 10 Cc. of distilled water, and the liquids, upon standing, be allowed to separate completely, the water removed from the Bromoform, treated with an excess of ammonia water, and then with a solution of iodine and ammonium iodide, until the black precipitate of nitrogen iodide, which may sometimes form, slowly disappears, it should not become milky in appearance, due to the separation of iodoform, which may be recognized by its odor (absence of *acetone*).

Average dose.— 0.2 Cc. (3 minims).

BROMUM

Bromine

$Br = 79.36$

It should contain not less than 97 percent. of pure Bromine, and be kept in protected glass-stoppered bottles, in a cool place.

A heavy, dark brownish-red, mobile liquid evolving, even at ordinary temperatures, reddish fumes, highly irritating to the eyes and lungs, and having a peculiar suffocating odor, resembling that of chlorine.

Specific gravity : about 3.016 at 25° C. (77° F.). Boiling point, about 63° C. (145.4° F.).

Soluble in 28 parts of water at 25° C. (77° F.), and readily soluble in alcohol or ether (with gradual decomposition of these liquids) ; also in carbon disulphide, and in chloroform, with a deep reddish-yellow color.

On exposure to air or to heat, it is completely volatilized without leaving any residue.

It destroys the color of solutions of litmus and indigo, and imparts a yellow color to solution of starch.

If Bromine be added to an excess of potassium hydroxide T.S., it should combine to form a permanently clear liquid, without the separation of oily drops (absence of *organic bromine compounds*).

If an aqueous solution of Bromine be shaken with a slight excess of reduced iron until it becomes nearly colorless, the filtered liquid, on the addition of a small amount of ferric chloride and of starch T.S., should not assume a blue color (absence of *iodine*).

BUCHU

Buchu

The dried leaves of ***Barosma betulina*** (Thunberg) Bartling and Wendland (Fam. ***Rutaceæ***).

About 15 Mm. long, varying between oval and obovate, yellowish-green, apex obtuse, margin crenate or serrate with a gland at the base of each tooth, the base more or less wedge-shaped ; coriaceous, both surfaces beset with numerous slight projections ; odor strong and characteristic ; taste somewhat mint-like, pungent and bitterish.

Average dose.— 2 Gm. (30 grains).

CAFFEINA

Caffeine

$C_8H_{10}N_4O_2 + H_2O = 210.64$

ebly basic substance $[C_5H(CH_3)_3N_4O_2 + H_2O]$ obtained from d leaves of ***Thea sinensis*** Linné (Fam. ***Ternstrœmiaceæ***), or from the dried seeds of *Coffea arabica* Linné (Fam. *Rubiaceæ*); found also in other plants.

White, flexible, silky, glistening needles, usually matted together in fleecy masses, permanent in the air; odorless, and having a bitter taste. If crystallized from water, it contains one molecule of water of crystallization, but if crystallized from alcohol, chloroform, or ether, it contains none.

Soluble in 45.6 parts of water, 53.2 parts of alcohol, 375 parts of ether, and 8 parts of chloroform at 25° C. (77° F.); soluble in 5.2 parts of water at 80° C. (176° F.), and in 17.1 parts of alcohol at 60° C. (140° F.). Its solubility in water is increased by the presence of certain salts,—*e.g.*, potassium bromide, sodium benzoate, sodium salicylate, and others.

Caffeine sublimes at about 178° C. (352.4° F.), and should leave no residue. When dried at 100° C. (212° F.), to constant weight, its melting point is 236.8° C. (458.3° F.).

An aqueous solution of Caffeine is neutral to litmus paper.

If a small quantity of Caffeine be dissolved in about 1 Cc. of hydrochloric acid in a porcelain dish, a little potassium chlorate added, the whole evaporated to dryness on a water-bath, and the dish then inverted over a vessel containing a few drops of ammonia water, the residue will acquire a rich purple color, which is destroyed by fixed alkalies.

If a fragment of Caffeine be dissolved in sulphuric acid and a minute fragment of potassium dichromate be added to the liquid, a yellowish-green color, which gradually becomes green, will be produced.

Caffeine should dissolve in sulphuric acid or in nitric acid without producing a color (absence of *organic impurities*).

Its aqueous solution should not be precipitated by mercuric potassium iodide T.S. (absence of *alkaloids*).

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

CAFFEINA CITRATA

Citrated Caffeine

Caffeine, *fifty grammes*	**50 Gm.**
Citric Acid, *fifty grammes*	**50 Gm.**
Distilled Water, hot, *one hundred cubic centimeters*	**100 Cc.**

Dissolve the Citric Acid in the hot Distilled Water, add the Caffeine, and evaporate the resulting solution, on a water-bath, to dryness, constantly stirring toward the end of the operation. Reduce the product to a fine powder and transfer it to well-stoppered bottles.

A white powder, odorless, having a slightly bitter, acid taste and an acid reaction.

One part of Citrated Caffeine forms a clear, syrupy solution, with about 4 parts of hot water. Upon dilution with 5 parts of water, a white, crystalline precipitate (caffeine) separates, which redissolves when about 25 parts of water have been added. It is also soluble in a mixture of equal volumes of chloroform and alcohol.

If 0.25 Gm. of Citrated Caffeine be mixed with 5 Cc. of concentrated sulphuric acid in a porcelain dish, the mixture protected from dust and heated for fifteen minutes on a water-bath, a lemon-yellow color, and not a brown or black color, should develop (absence of *tartaric acid*).

Average dose.— 0.125 Gm. = 125 milligrammes (2 grains).

CAFFEINA CITRATA EFFERVESCENS

Effervescent Citrated Caffeine

Citrated Caffeine, *forty grammes*	40 Gm.
Sodium Bicarbonate, dried and powdered, *five hundred and seventy grammes*	570 Gm.
Tartaric Acid, dried and powdered, *three hundred grammes* . .	300 Gm.
Citric Acid, uneffloresced crystals, *one hundred and ninety-five grammes*	195 Gm.
To make about *one thousand grammes* . .	1000 Gm.

Powder the Citric Acid and mix it intimately with the Citrated Caffeine and Tartaric Acid, then thoroughly incorporate the Sodium Bicarbonate. Place the mixed powders on a plate of glass or in a suitable dish, in an oven heated to between 93° and 104° C. (199.4° and 219.2° F.).

When the mixture has acquired a moist consistence by the aid of careful manipulation with a wooden spatula, rub it through a No. 6 tinned-iron sieve, and dry the granules at a temperature not exceeding 54° C. (129.2° F.). Keep the product in well-stoppered bottles.

Average dose.—4 Gm. (60 grains).

CALAMUS

Calamus

The unpeeled, dried rhizome of *Acorus Calamus* Linné (Fam. *Araceæ*).

Rhizome 1 to 2 Cm. thick, usually in longitudinally split pieces of various lengths; when entire, cylindraceous and somewhat vertically flattened, externally reddish-brown, somewhat annulate from remnants of leaf-sheaths; upper surface with triangular leaf-scars, the lower surface with circular pitted scars of roots; fracture short, showing numerous oil-cells and scattered fibrovascular bundles, the latter crowded within the endodermis; odor aromatic; taste pungent and bitter.

Average dose.—1 Gm. (15 grains).

CALCII BROMIDUM

Calcium Bromide

$CaBr_2 = 198.52$

It should contain not less than 97 percent. of pure Calcium Bromide and should be kept in well-stoppered bottles.

A white, granular salt, odorless, of a sharp, saline taste, and very deliquescent. Very soluble in water and alcohol.

An aqueous solution of the salt is neutral to litmus paper.

The aqueous solution of the salt (1 in 20) yields with ammonium oxalate T.S. a white precipitate, insoluble in acetic acid but soluble in hydrochloric acid.

Silver nitrate T.S. produces a light yellow precipitate, insoluble in nitric acid and in a moderate excess of ammonia water.

If to 10 Cc. of the aqueous solution of the salt (1 in 20), 1 Cc. of chloroform be added, then chlorine water, which has been diluted with an equal volume of water, added cautiously, drop by drop, with constant agitation, the liberated bromine will dissolve in the chloroform, imparting to it a yellow to orange color free from any violet tint (absence of *iodides*).

If 1 Gm. of Calcium Bromide be added to 20 Cc. of water, it should form a clear, colorless solution, leaving no residue (absence of *insoluble impurities*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of Calcium Bromide and 1 Gm. of sodium acetate be dissolved in 5 Cc. of distilled water, and the solution made slightly acid through the addition of from 3 to 5 drops (or a sufficient quantity) of diluted acetic acid, after boiling and thoroughly cooling, the solution should not become cloudy within five minutes upon the addition, with agitation, of 5 drops of potassium dichromate T.S. (absence of *barium*).

If diluted sulphuric acid be dropped upon the salt, the latter should not at once assume a yellow color (absence of *bromate*).

To 5 Cc. of an aqueous solution of the salt (1 in 100), contained in a test-tube of about 40 Cc. capacity, add 5 Cc. of potassium hydroxide T.S. and about 0.2 Gm. of aluminum wire. In the upper portion of the test-tube, insert a plug of purified cotton or gauze, and over the mouth, a piece of moistened red litmus paper; place the tube in a bath of boiling water, and after fifteen minutes no blue coloration of the paper should be discernible (limit of *nitrates* and *ammonia*).

Average dose.—1 Gm. (15 grains).

CALCII CARBONAS PRÆCIPITATUS

Precipitated Calcium Carbonate

$CaCO_3 = 99.35$

It should contain not less than 99 percent. of pure Calcium Carbonate.

A fine, white powder, without odor or taste, and permanent in the air.

Nearly insoluble in water; the solubility is increased by the presence of ammonium salts, and especially by carbon dioxide; alkali hydroxides diminish its solubility; insoluble in alcohol; in diluted acetic, hydrochloric, or nitric acid, it is completely soluble with effervescence.

When heated to full redness, with access of air, the salt gradually loses carbon dioxide, and a residue of calcium oxide remains.

For applying tests of identity and of purity, 5 Gm. of Calcium Carbonate are mixed with 100 Cc. of distilled water, followed by hydrochloric acid, added drop by drop, with agitation, until solution takes place. The resulting solution should, after boiling and cooling, be of acid reaction, and there should not remain more than traces of insoluble matter.

In a portion of this acid solution, after neutralizing with ammonia water, ammonium oxalate T.S. produces a white precipitate of calcium oxalate, insoluble in acetic acid but soluble in hydrochloric acid.

If to 20 Cc. of the acid solution, ammonia water be added until of alkaline reaction, no turbidity or precipitation should take place either before or after boiling (limit of *iron, aluminum, phosphates*, etc.).

The acid solution should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of the salt be agitated with 50 Cc. of water, the filtrate should not show an alkaline reaction with litmus paper, and, on evaporation, should not leave a weighable residue (limit of *soluble impurities*).

Average dose.—1 Gm. (15 grains).

CALCII CHLORIDUM

Calcium Chloride

$CaCl_2 = 110.16$

Calcium Chloride, rendered anhydrous by fusion at the lowest possible temperature. It should contain not less than 99 percent. of pure Calcium Chloride, and should be kept in well-stoppered bottles.

White, slightly translucent, hard fragments, odorless, having a sharp, saline taste.

It is very deliquescent.

Soluble in 1.3 parts of water, and in 8 parts of alcohol at 25° C. (77° F.); in 1.5 parts of boiling alcohol, and very freely soluble in boiling water, usually leaving a slight residue.

Below a red heat the salt fuses, and, on cooling, solidifies without change in composition.

When perfectly pure, Calcium Chloride dissolves in water without residue; the solution should be strictly neutral to litmus paper.

When the salt has been overheated in fusing, the solution has an alkaline reaction, and a small residue of calcium oxide is left, which is soluble in hydrochloric acid.

The aqueous solution (1 in 20) yields, with ammonium oxalate T.S., a white precipitate insoluble in acetic acid, but soluble in hydrochloric acid.

With silver nitrate T.S. it yields a white precipitate insoluble in nitric acid.

If to the aqueous solution of the salt (1 in 20) ammonia water be added, until of alkaline reaction, no turbidity or precipitation should take place either before or after boiling (limit of *iron, aluminum, phosphates*, etc.).

If from 10 Cc. of the solution the calcium be completely precipitated by ammonium oxalate T.S., the filtrate should, on evaporation and ignition, leave not more than 0.1 percent. of fixed residue (limit of *magnesium* and *alkalies*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *arsenic* or *lead* (see Appendix, Test No. 121).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

CALCII HYPOPHOSPHIS

Calcium Hypophosphite

$Ca(PH_2O_2)_2 = 168.86$

It should contain not less than 98 percent. of pure Calcium Hypophosphite [$(PO.OH_2)_2Ca$], and should be kept in well-stoppered bottles; caution should be observed in dispensing Calcium Hypophosphite, as explosion is liable to occur when it is triturated or heated with nitrates, chlorates, or other oxidizing agents.

Colorless, transparent, monoclinic prisms, or small, lustrous scales, or a white, crystalline powder, odorless, having a nauseous and bitter taste; permanent in the air.

Soluble in 6.5 parts of water at 25° C. (77° F.), and in 6 parts of boiling water; insoluble in alcohol.

When heated in a test-tube the salt decrepitates, and above 300° C. (572° F.) it begins to decompose, giving off water, and emitting inflammable gases (hydrogen and hydrogen phosphide), and leaving a residue of calcium pyrophosphate and metaphosphate, with some red phosphorus.

The aqueous solution (1 in 20) yields with ammonium oxalate T.S. a white precipitate, insoluble in acetic acid, but soluble in hydrochloric acid. One Gm. of the salt dissolved in 20 Cc. of water, should not require the addition of more than 1 Cc. of tenth-normal potassium hydroxide V.S. to produce a pink color (phenolphthalein being used as indicator).

The diluted aqueous solution, slightly acidulated with diluted nitric acid, yields with silver nitrate T.S. a precipitate, which is white at first but rapidly turns brown and black, due to the separation of metallic silver. With copper sulphate T.S., on gentle heating, a reddish-brown precipitate is formed.

When the aqueous solution of Calcium Hypophosphite (1 in 20), acidulated with hydrochloric acid, is added, drop by drop, with agitation, to an excess of mercuric chloride T.S., a white precipitate of mercurous chloride is formed. On further addition of the hypophosphite solution in excess, the precipitate becomes gray in color, due to its reduction to metallic mercury.

If 1 Gm. of the salt be added to 20 Cc. of water and well shaken, not more than a trace of residue should remain (absence of *phosphate* and *sulphate*).

If 5 Cc. of an aqueous solution of the salt (1 in 10) be measured into a beaker containing 3 Cc. of nitric acid, diluted with about 10 Cc. of water, and evaporated to dryness on a water-bath, the residue should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

The aqueous solution of the salt (1 in 20), acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

CALCII PHOSPHAS PRÆCIPITATUS

Precipitated Calcium Phosphate

$Ca_3(PO_4)_2 = 307.98$

It should contain not less than 99 percent. of pure Calcium Phosphate $[(PO.O_3)_2Ca_3]$.

A white, amorphous powder, odorless and tasteless; permanent in the air.

Almost insoluble in cold water; partly decomposed by boiling water, which dissolves out the acid salt; almost insoluble in acetic acid, except when freshly precipitated; easily soluble in hydrochloric or nitric acid; insoluble in alcohol.

At an intense white heat, the salt fuses without decomposition.

When moistened with silver nitrate T.S., either before or after ignition, the salt acquires a yellow color (distinction from *acid calcium phosphate*, which, after ignition, when moistened with silver nitrate T.S., remains white).

For applying tests of identity and of purity, shake 2 Gm. of Precipitated Calcium Phosphate with 20 Cc. of water, add nitric acid, drop by drop, until solution is effected, and then add sufficient water to make the liquid measure 40 Cc. While making this solution, no effervescence should occur on adding the acid (absence of *carbonate*).

From a portion of this solution the salt is precipitated unchanged by a slight excess of ammonia water.

From another portion ammonium molybdate T.S. precipitates yellow ammonium phosphomolybdate; the reaction is accelerated by a gentle heat, not exceeding 65° C. (149° F.).

If to 5 Cc. of the solution, acidulated with nitric acid, 0.5 Cc. of silver nitrate T.S. be added, not more than a slight turbidity should result (limit of *chloride*).

If to 5 Cc. of the solution, strongly acidulated with nitric acid, 1 Cc. of potassium sulphate T.S. be added, no turbidity should result upon standing (absence of *barium*).

An aqueous solution of Calcium Phosphate (1 in 20), obtained by shaking the salt with water, adding hydrochloric acid, drop by drop, and heating until solution is effected, should not respond to the Time-Limit Test for *heavy metals*, omitting the addition of ammonia water (see Appendix, Test No. 121).

Five Cc. of a solution (1 in 10) of Calcium Phosphate, in diluted hydrochloric acid, should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.—1 Gm. (15 grains).

CALCII SULPHAS EXSICCATUS

Exsiccated Calcium Sulphate

A powder containing about 95 percent., by weight, of Calcium Sulphate [$CaSO_4 = 135.15$], and about 5 percent. of water; prepared from the purer varieties of native gypsum [$CaSO_4 + 2H_2O = 170.91$], by carefully heating until about three-fourths of the water has been expelled.

Exsiccated Calcium Sulphate should be kept in well-closed vessels, carefully protected from moisture.

A fine, white powder, without odor or taste.

From moist air it attracts water, becomes granular, and then loses the property of hardening with water.

When mixed with half its weight of water, Exsiccated Calcium Sulphate forms a smooth, cohesive paste, which rapidly hardens.

It is soluble in about 378 parts of water at 25° C. (77° F.), and in 451 parts at 100° C. (212° F.). In alcohol it is insoluble. It readily dissolves in diluted nitric or hydrochloric acid; also in saturated solutions of potassium nitrate, sodium thiosulphate, and of various ammonium salts.

When heated above 204° C. (399.2° F.), Exsiccated Calcium Sulphate becomes anhydrous and loses the property of forming a paste with water which hardens rapidly.

Its saturated solution in water is neutral to litmus paper, and forms white precipitates with barium chloride T.S., with ammonium oxalate T.S., and with alcohol.

No effervescence should occur on the addition of diluted acids to Exsiccated Calcium Sulphate (absence of *carbonate*).

CALENDULA

Calendula

The dried ligulate florets of *Calendula officinalis* Linné (Fam. *Compositæ*).

Florets, 15 to 25 Mm. long, yellow or orange-colored, one- to three-toothed, the short hairy tube occasionally enclosing the remnants of a filiform style and bifid stigma; odor slight and somewhat heavy; taste slightly bitter and faintly saline.

Average dose.—1 Gm. (15 grains).

CALUMBA

Calumba

The dried root of *Jateorhiza palmata* (Lamarck) Miers (Fam. *Menispermaceæ*).

In transverse, circular or oval, biconcave sections, 2.5 to 5 Cm. in diameter and 2 to 12 Mm. thick; externally greenish-brown and roughly wrinkled; internally yellowish or grayish-yellow, with a few interrupted circles of fibrovascular bundles, distinctly radiate in the outer portion, with a dark cambium; fracture short, mealy; odor slight; taste slightly aromatic, very bitter.

Average dose.—2 Gm. (30 grains).

CALX

Lime Calcium Oxide

$CaO = 55.68$

Prepared by calcining white marble, or the purest varieties of native calcium carbonate, and containing, when in the anhydrous state, not less than 90 percent. of pure Calcium Oxide. It should be kept in well-closed vessels, in a dry place.

Hard, white, or grayish-white masses, which, in contact with the air, gradually attract moisture and carbon dioxide, and fall to a white powder; odorless, and having a caustic taste.

Soluble in about 760 parts of water at 25° C. (77° F.), and in about 1600 parts of boiling water; insoluble in alcohol. It forms readily soluble salts with diluted acetic, hydrochloric, or nitric acids.

When sprinkled with about half its weight of water, Calcium Oxide becomes heated, and is gradually converted into a white powder (calcium hydroxide or slaked lime). When this is mixed with about 3 or 4 parts of water, it forms a smooth magma (milk of lime).

Its aqueous solution has an alkaline reaction upon red litmus paper.

If 1 Gm. of Calcium Oxide be slaked and then thoroughly mixed with 50 Cc. of water, and the greater portion of the milky liquid decanted, the addition of hydrochloric acid to this residue should not cause more than a slight effervescence (limit of *carbonate*).

For applying tests of identity and of purity, 5 Gm. of Calcium Oxide, after slaking, are mixed with 100 Cc. of distilled water, followed by hydrochloric acid, added drop by drop, with agitation until solution takes place. The resulting solution should, after boiling and cooling, be of acid reaction and not deposit more than 0.025 Gm. of insoluble matter.

With a portion of this solution, after neutralizing with ammonia water, ammonium oxalate T.S. produces a white precipitate of calcium oxalate, insoluble in acetic acid, but soluble in hydrochloric acid.

CALX CHLORINATA

Chlorinated Lime Chlorinated Calcium Oxide

[CALX CHLORATA, PHARM. 1890]

A compound resulting from the action of chlorine upon calcium hydroxide, and containing not less than 30 percent. of available chlorine. It is often improperly called "Chloride of Lime." It should be kept in well-closed vessels, in a cool and dry place.

A white, or grayish-white, granular powder, exhaling the odor of hypochlorous acid, having a repulsive, saline taste, and becoming moist and gradually decomposing on exposure to air.

In water or in alcohol it is only partially soluble.

An aqueous solution first colors red litmus paper blue, and then bleaches it.

If Chlorinated Lime be dissolved in diluted acetic acid, an abundance of chlorine gas will be evolved, and only a trifling residue remain undissolved.

From this solution ammonium oxalate T.S. throws down a white precipitate, insoluble in acetic acid but soluble in hydrochloric acid.

Introduce into a stoppered weighing-bottle between 3 and 4 Gm. of Chlorinated Lime and weigh accurately; triturate this thoroughly with 50 Cc. of water, transfer the mixture to a graduated vessel, together with the rinsings, and add sufficient water to make 1000 Cc. After thoroughly shaking, add to 100 Cc. of the mixture 1 Gm. of potassium iodide, 5 Cc. of diluted hydrochloric acid, and sufficient tenth-normal sodium thiosulphate V.S. for complete decolorization. Multiply the number of Cc. of tenth-normal sodium thiosulphate V.S. consumed, by 0.3518, and divide this product by one-tenth of the weight of the Chlorinated Lime taken; the quotient represents the percentage of available chlorine present.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

CALX SULPHURATA

Sulphurated Lime

A mixture containing at least 55 percent. of calcium sulphide [$CaS = 71.63$], together with unchanged calcium sulphate [$CaSO_4 = 135.15$], and carbon, in varying proportions.

Exsiccated Calcium Sulphate, in fine powder, *seventy grammes*	70 Gm.
Charcoal, in fine powder, *ten grammes*	10 Gm.
Starch, *two grammes*	2 Gm.

Mix the powder thoroughly, pack the mixture lightly into a crucible, cover this loosely, and heat it to bright redness, until the contents have lost their black color. Allow the crucible to cool, reduce the product to powder, and at once transfer it to small, glass-stoppered vials.

A pale gray powder, exhaling a faint odor of hydrogen sulphide, having a nauseous and alkaline taste; gradually decomposing by exposure to moist air.

Very slightly soluble in cold water, more readily in boiling water, which partially decomposes it; insoluble in alcohol.

When Sulphurated Lime is decomposed by diluted acetic acid, calcium acetate is formed, hydrogen sulphide gas is evolved, and a residue of calcium sulphate and carbon remains.

The filtrate from this yields with ammonium oxalate T.S. a white precipitate, insoluble in acetic acid, but soluble in hydrochloric acid.

If 1 Gm. of Sulphurated Lime be added to a cold solution of 1.9 Gm. of cupric sulphate in 50 Cc. of water, followed by 10 Cc. of diluted hydrochloric acid, added in small portions, with constant stirring, and the mixture digested on a water-bath for 15 minutes and filtered, the addition of an excess of ammonia water should impart no color to the filtrate (presence of at least 55 percent. of pure Calcium Sulphide).

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

CAMBOGIA

Gamboge

A gum-resin obtained from *Garcinia Hanburii* Hooker filius (Fam. *Guttiferæ*).

In cylindrical pieces, usually hollow in the centre, of variable length, 2 to 5 Cm. in diameter, externally grayish orange-brown, longitudinally striate; fracture conchoidal, orange-red, waxy, and somewhat porous; inodorous; taste very acrid.

Powder bright yellow, sternutatory, containing few or no starch grains. Not more than 25 percent, should be insoluble in alcohol; ash not more than 3 percent.

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

CAMPHORA

Camphor

$C_{10}H_{16}O = 150.98$

The dextrogyrate modification of the saturated ketone [$C_9H_{16}CO$], obtained from *Cinnamomum Camphora* (Linné) Nees et Ebermaier (Fam. *Lauraceæ*), and purified by sublimation. Camphor should be kept in well-closed vessels, in a cool place.

White, translucent masses, of a tough consistence and a crystalline structure, readily pulverizable in the presence of a little alcohol, ether, or chloroform; having a penetrating, characteristic odor, and a pungent, aromatic taste.

Specific gravity: 0.990 at 25° C. (77° F).

It is optically active, being dextrogyrate.

Very sparingly soluble in water, but readily soluble in alcohol, ether, chloroform, carbon disulphide, petroleum benzin, and in fixed and volatile oils.

When Camphor is triturated, in about molecular proportions, with menthol, thymol, phenol, or hydrated chloral, liquefaction ensues. It melts at 175° C. (347° F.), boils at 204° C. (399.2° F.), and is inflammable, burning with a luminous, smoky flame.

On exposure to the air, it evaporates more or less rapidly at ordinary temperatures, and, when moderately heated, it sublimes without leaving a residue.

If a small piece of Camphor be dropped into a small porcelain dish, the latter placed in a larger dish, and a clean beaker moistened on the inner surface with distilled water be inverted over the smaller dish immediately after igniting the Camphor, a part of the products of combustion will be absorbed by the water; if the beaker be then rinsed with a little distilled water, and the liquid filtered, the filtrate should yield no turbidity upon the addition of a few drops of silver nitrate T.S. (absence of *chlorinated products*).

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

CAMPHORA MONOBROMATA

Monobromated Camphor

$C_{10}H_{15}BrO = 229.34$

A substitution product of camphor [$C_9H_{15}Br.CO$].

Colorless, prismatic needles or scales, having a mild but characteristic camphoraceous odor and taste, permanent in the air, unaffected by light, and neutral to litmus paper.

Almost insoluble in water; freely soluble in alcohol, ether, chloroform, hot petroleum benzin, and fixed and volatile oils; slightly soluble in glycerin; it is also soluble, without decomposition, in cold, concentrated sulphuric acid, from which it separates again unaltered, when the solution is poured into water.

It melts at 76° C. (168.8° F.), and sublimes at a slightly higher temperature. At 274° C. (525.2° F.) it boils without decomposition, and is finally volatilized without leaving a residue.

If a few crystals of Monobromated Camphor be fused in a dry test-tube with metallic sodium, the residue dissolved in water and the solution acidulated with nitric acid, a copious, faintly yellowish precipitate should be produced upon the addition of silver nitrate T.S.

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

CANNABIS INDICA

Indian Cannabis

The dried flowering tops of the pistillate plants of *Cannabis sativa* Linné (Fam. *Moraceæ*), grown in the East Indies and gathered while the fruits are yet undeveloped, and carrying the whole of their natural resin.

In dark green or more or less brownish compressed masses, consisting of the densely paniculate branchlets, about 5 Cm. or more in length, and the inflorescence more or less agglutinated with a resinous exudation; commonly with a few undeveloped digitate leaves of one or more linear-lanceolate leaflets; clothed with numerous sheathing, pointed bracts, each containing two small mature but unfertilized pistillate flowers; odor agreeably narcotic; taste characteristic.

In the powder few or no pollen grains or stone-cells should be present.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

CANTHARIS

Cantharides

The beetle, *Cantharis vesicatoria* (Linné) De Geer, thoroughly dried at a temperature not exceeding 40° C. (104° F.).

From 18 to 25 Mm. long, about 6 Mm. broad; flattish-cylindrical, with filiform antennæ; black in the upper part, with two long wing-sheaths, and ample membranous, transparent, brownish wings; elsewhere of a shining coppery-green color; odor strong and disagreeable; taste slight, afterwards acrid.

The powder is grayish-brown, with shining green particles, and contains few or no hairs; ash not more than 8 percent.

Average dose.— 0.030 Gm. = 30 milligrammes (½ grain).

CAPSICUM

Capsicum

The dried, ripe fruit of *Capsicum fastigiatum* Blume (Fam. *Solanaceæ*), deprived of its calyx.

Oblong-conical, from 10 to 20 Mm. long, with a red, shining, membranous and translucent pericarp; two-celled, and containing 10 to 20 flat, reniform, yellowish seeds attached to a thick, central placenta; odor distinct; taste intensely pungent. Few or no starch grains or sclerenchymatous fibres should be present in the powder.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

CARBO ANIMALIS

Animal Charcoal

Charcoal prepared from bone.

Dull black, granular fragments, or a dull black powder, odorless, nearly tasteless, and insoluble in water or alcohol.

When ignited, it leaves a grayish or yellowish-white ash, amounting to about 85 percent. of the original weight of the portion taken, which should have been previously dried at 120° to 125° C. (248° to 257° F.) to a constant weight.

The ash should be soluble in hydrochloric acid with the aid of heat, leaving not more than a trifling residue.

If 1 Gm. of Animal Charcoal be boiled for several minutes with a mixture of 3 Cc. of potassium hydroxide T.S. and 5 Cc. of water, the filtrate should be colorless or nearly so (evidence of *complete carbonization*).

CARBO ANIMALIS PURIFICATUS

Purified Animal Charcoal

Animal Charcoal, in No. 60 powder, *one hundred grammes* . .	100 Gm.
Hydrochloric Acid, *three hundred grammes*	300 Gm.
Boiling Water, *a sufficient quantity*.	

Introduce the Animal Charcoal into a capacious vessel, add *two hundred grammes* of Hydrochloric Acid, and *four hundred cubic centimeters* of Boiling Water. By means of a sand-bath keep the mixture gently boiling during eight hours, adding water occasionally to maintain the original volume. Then add *five hundred cubic centimeters* of Boiling Water, transfer the mixture to a muslin strainer, and, when the liquid has run off, return the Charcoal to the vessel. Add to it *one hundred grammes* of Hydrochloric Acid and *two hundred cubic centimeters* of Boiling Water, boil for two hours, again add *five hundred cubic centimeters* of Boiling Water, transfer the whole to a plain filter, and when the liquid has passed through, wash the residue with Boiling Water until the washings produce only a faint cloudiness with silver nitrate T.S. Dry the powder in a drying oven, and immediately transfer it to well-stoppered vials.

A dull black powder, odorless, tasteless, and insoluble in water, alcohol, or other solvents.

If 2 Gm. of the powder be ignited at a red heat with free access of air in a broad, shallow porcelain or platinum dish, it should not leave a residue weighing more than 0.08 Gm., or 4 percent. of the original weight (limit of *silicates* and *other fixed inorganic matter*).

If 1 Gm. of the powder be boiled with a mixture of 3 Cc. of potassium hydroxide T.S. and 5 Cc. of water during three minutes, the filtrate should be colorless (evidence of *complete carbonization*).

CARBO LIGNI

Charcoal

Charcoal prepared from soft wood, and very finely powdered. It should be kept in well-closed vessels.

A black, odorless, and tasteless powder, free from gritty matter.

If 1 Gm. of Charcoal be boiled with a mixture of 3 Cc. of potassium hydroxide T.S. and 5 Cc. of water for several minutes, the filtrate should be colorless or nearly so (evidence of *complete carbonization*).

Average dose.—1 Gm. (15 grains).

CARBONEI DISULPHIDUM

Carbon Disulphide

$CS_2 = 75.57$

Carbon Disulphide should be kept in partially filled, well-stoppered bottles, or in tin cans, in a cool place, remote from lights or fire.

A clear, colorless, highly refractive liquid, very diffusive, having a strong, characteristic but not fetid odor, and a sharp, aromatic taste.

Specific gravity: 1.256 to 1.257 at 25° C. (77° F.).

Soluble in 526 parts of water at 25° C. (77° F.); very soluble in alcohol, ether, chloroform, fixed and volatile oils.

Carbon Disulphide vaporizes rapidly at the ordinary temperature, is highly inflammable, boils at 46° to 47° C. (114.8° to 116.6° F.), and when ignited, burns with a bluish-white flame, producing carbon dioxide and sulphur dioxide.

It should not affect the color of blue litmus paper moistened with water (absence of *sulphur dioxide*).

A portion evaporated spontaneously in a glass vessel should leave no residue (absence of *dissolved sulphur*). Lead acetate T.S. agitated with it should not be blackened (absence of *hydrogen sulphide*).

CARDAMOMUM

Cardamom

The dried nearly ripe fruit of *Elettaria repens* (Sonnerat) Baillon (Fam. *Zingiberaceæ*).

Oblong-ovoid, obtusely triangular in transverse section, from 10 to 20 Mm. long, slightly beaked at the apex, rounded to truncate at the base; three-celled and with central placentæ; pericarp thin, leathery, nearly tasteless, and of a pale yellow color; seeds 15 to 18 in number, about 4 Mm. long, oblong-ovoid and irregularly angular, reddish-brown, enclosed in a thin, membranous aril; odor and taste strongly and agreeably aromatic. Ash not more than 4 percent.

The seeds alone contain active and valuable constituents.

Average dose.— 1 Gm. (15 grains).

CARUM

Caraway

The dried fruit of *Carum Carvi* Linné (Fam. *Umbelliferæ*).

About 4 or 5 Mm. long, oblong, laterally compressed, usually separated into the two mericarps, which are curved, tapering toward each end, dark brown, with five yellowish, filiform ribs, and with six oil-tubes; seed plane upon the face, nearly equilaterally pentagonal in transverse section; odor and taste agreeably aromatic; ash not more than 8 percent.

Average dose.— 1 Gm. (15 grains).

CARYOPHYLLUS

Cloves

The dried flower buds of *Eugenia aromatica* (Linné) O. Kuntze (Fam. *Myrtaceæ*).

About 15 Mm. long, brownish-black, consisting of a stem-like, solid calyx-tube, obscurely four-angled and granular roughened, terminated by four teeth, and surmounted by a globular head, consisting of four petals, which cover numerous curved stamens and one style; odor strongly aromatic; taste pungent and aromatic, followed by slight numbness.

Cloves should not float in a horizontal position on water.

The powder contains few or no starch grains or stone cells. Ash not more than 8 percent.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

CASSIA FISTULA

Cassia Fistula

The dried fruit of *Cassia Fistula* Linné (Fam. *Leguminosæ*).

Cylindrical, 25 to 50 Cm. long, about 20 Mm. in diameter, chestnut-brown in color, on one side a longitudinal groove and on the other a smooth line or slight ridge, indicating the two sutures; indehiscent, the cavity divided transversely into numerous compartments, each containing a reddish-brown, glossy, flattish-ovoid seed embedded in a blackish-brown pulp; with an odor resembling that of prunes, and a mawkish sweet taste.

Average dose.— 4 Gm. (60 grains).

CATAPLASMA KAOLINI

Cataplasm of Kaolin

Kaolin, in very fine powder, *five hundred and seventy-seven grammes*	577.0 Gm.
Boric Acid, in very fine powder, *forty-five grammes*	45.0 Gm.
Thymol, *one-half gramme*	0.5 Gm.
Methyl Salicylate, *two grammes*	2.0 Gm.
Oil of Peppermint, *one-half gramme*	0.5 Gm.
Glycerin, *three hundred and seventy-five grammes*	375.0 Gm.
To make about *one thousand grammes* . .	1000 Gm.

Heat the Kaolin in a suitable vessel at 100° C. (212° F.), with occasional stirring, for one hour; mix it intimately with the Boric Acid, and then incorporate the mixture thoroughly with the Glycerin; finally add the Thymol, which has been dissolved in the Methyl Salicylate and the Oil of Peppermint, and make a homogeneous mass. It should be kept in an air-tight container.

CERA ALBA

White Wax

Yellow Wax, bleached.

A yellowish-white solid, somewhat translucent in thin layers, having a faint, characteristic odor, and nearly tasteless.

Specific gravity: 0.950 to 0.960 at 25° C. (77° F.).

Melting point: 64° to 65° C. (147.2° to 149° F.).

In other respects White Wax has the characteristics of, and should respond to the reactions and tests given under, *Cera Flava*.

CERA FLAVA

Yellow Wax

A solid substance prepared from the honey-comb of the bee, *Apis mellifera* Linné.

A yellowish to brownish-yellow solid, having an agreeable, honey-like odor, and a faint balsamic taste.

Specific gravity: 0.951 to 0.960 at 25° C. (77° F.).

Melting point: 62° to 64° C. (143.6° to 147.2° F.).

It is somewhat brittle when cold, and when broken presents a dull, granular, not crystalline fracture. By the heat of the hand it becomes plastic.

Yellow Wax is insoluble in water, sparingly soluble in cold alcohol; boiling alcohol dissolves the cerotic acid and a portion of the myricin. It is completely soluble in ether, chloroform, and in fixed and volatile oils; partially soluble in cold benzene or carbon disulphide, and completely soluble in these liquids at a temperature of 25° to 30° C. (77° to 86° F.).

If 1 Gm. of Yellow Wax be boiled for half an hour with 35 Cc. of an aqueous solution of sodium hydroxide (1 in 7), the volume being preserved by the occasional addition of water, the Wax should separate on cooling without rendering the liquid opaque, and no precipitate should be produced in the liquid, after filtration through glass-wool or asbestos, on the addition of hydrochloric acid (absence of *fats* or *fatty acids*, *Japan wax*, or *rosin*). Hydrochloric acid should produce no precipitate in water which has been boiled with a portion of the Wax (absence of *soap*).

If 5 Gm. of Yellow Wax be heated in a flask to 160° C. (320° F.), for fifteen minutes, with 25 Cc. of sulphuric acid, and the mixture then poured into a large excess of water, no notable amount of solid substance which cannot be decomposed by sulphuric acid on further treatment, should separate (absence of *paraffin* or *ceresin*).

Yellow Wax saponified by alcoholic potassium hydroxide T.S. should show a saponification value of from 90 to 96 (see Appendix, Test No. 99).

CERATUM

Cerate

White Wax, *three hundred grammes*	300 Gm.
White Petrolatum, *two hundred grammes*	200 Gm.
Benzoinated Lard, *five hundred grammes*	500 Gm.
To make *one thousand grammes*	1000 Gm.

Melt the White Wax, add the White Petrolatum, then the Benzoinated Lard, continuing the heat until the mixture is liquefied, and stir it constantly until it congeals.

For use in southern latitudes, and during the heated season in other localities, *fifty grammes* of Benzoinated Lard may be replaced by an equal quantity of White Wax.

CERATUM CAMPHORÆ

Camphor Cerate

Camphor Liniment, *one hundred grammes*	100 Gm.
White Wax, *three hundred and fifty grammes*	350 Gm.
White Petrolatum, *one hundred and fifty grammes*	150 Gm.
Benzoinated Lard, *four hundred grammes*	400 Gm.
To make *one thousand grammes*	1000 Gm.

Melt the Yellow Wax and the White Petrolatum, then the Benzoinated Lard, and continue the heat until the mixture is liquefied. While the mixture is cooling, add the Camphor Liniment and incorporate thoroughly by stirring until it congeals.

CERATUM CANTHARIDIS

Cantharides Cerate

Cantharides, *in No. 60 powder, three hundred and twenty grammes*	320 Gm.
Liquid Petrolatum, *one hundred and fifty grammes*	150 Gm.
Yellow Wax, *one hundred and eighty grammes*	180 Gm.
Rosin, *one hundred and eighty grammes*	180 Gm.
Lard, *one hundred and seventy grammes*	170 Gm.
To make *one thousand grammes* . .	1000 Gm.

Mix the Cantharides with the Liquid Petrolatum, and set the mixture aside, well covered, in a warm place, for forty-eight hours. Then add it to the Rosin, Yellow Wax, and Lard, previously melted and strained through muslin, and keep the mixture in a liquid condition by means of a water bath, stirring occasionally, for one hour. Finally, remove it from the bath, and stir the mixture until it begins to congeal.

CERATUM PLUMBI SUBACETATIS

Cerate of Lead Subacetate

Solution of Lead Subacetate, *twenty grammes*	20 Gm.
Wool-Fat, *twenty grammes*	20 Gm.
Paraffin, *twenty grammes*	20 Gm.
White Petrolatum, *thirty eight grammes*	38 Gm.
Camphor, *two grammes*	2 Gm.
To make *one hundred grammes* . .	100 Gm.

To the melted Wool-Fat in a warm mortar gradually add the Solution of Lead Subacetate, and incorporate it by slow trituration. To the mixture add the White Petrolatum and Paraffin, previously melted, and in which the Camphor has been dissolved; mix thoroughly until homogeneous.

CERATUM RESINÆ

Rosin Cerate

Rosin, *three hundred and fifty grammes*	350 Gm.
Yellow Wax, *one hundred and fifty grammes*	150 Gm.
Lard, *five hundred grammes*	500 Gm.
To make *one thousand grammes* . .	1000 Gm.

Melt the Rosin, add the Yellow Wax and the Lard, and continue the heat until liquefied, then strain the liquid through muslin, and allow it to congeal with occasional stirring.

In cold weather *five hundred and thirty grammes* of Lard, and *one hundred and twenty grammes* of Yellow Wax may be used.

CERATUM RESINÆ COMPOSITUM

Compound Rosin Cerate

Rosin, *two hundred and twenty-five grammes*	225 Gm.
Yellow Wax, *two hundred and twenty-five grammes*	225 Gm.
Prepared Suet, *three hundred grammes*	300 Gm.
Turpentine, *one hundred and fifteen grammes*	115 Gm.
Linseed Oil, *one hundred and thirty-five grammes*	135 Gm.
To make *one thousand grammes*	1000 Gm.

Melt the Rosin, Yellow Wax, Turpentine, and Prepared Suet; to this add the Linseed Oil, and continue the heat until the mixture is liquefied; then strain it through coarse muslin, and stir it until it begins to congeal.

CERII OXALAS

Cerium Oxalate

Cerium Oxalate consists chiefly of a mixture of the oxalates of cerium, didymium, and lanthanum, and of other rare earths of this group.

A fine, white powder, without odor or taste, and permanent in the air.

Insoluble in water, alcohol, ether, or in solutions of potassium or sodium hydroxide; insoluble in cold, but soluble in hot, diluted sulphuric or hydrochloric acid.

When heated to redness it is decomposed, leaving a residue of reddish-brown ceric and other rare-earth oxides, constituting not less than 47 percent. of the salt.

On boiling the salt with potassium hydroxide T.S., an insoluble residue of white hydroxides is produced; if the filtrate from this residue be supersaturated with acetic acid, the addition of calcium chloride T.S. will produce a white precipitate, insoluble in acetic acid but soluble in hydrochloric acid.

If the residue left after heating Cerium Oxalate be dissolved in concentrated sulphuric acid, and a small crystal of strychnine added, a deep blue color will appear, which will rapidly change to purple and then to red.

From the solution in diluted hydrochloric or sulphuric acid, potassium hydroxide T.S. precipitates white hydroxides, which do not redissolve in an excess of the reagent, and gradually turn yellow in contact with air. Ammonium carbonate T.S. precipitates from the same solution white cerous and other rare-earth carbonates, which are somewhat soluble in an excess of the reagent.

If 0.1 Gm. of Cerium Oxalate be dissolved in 1 Cc. of sulphuric acid, and 2 Cc. of potassium sulphate T.S. be added, small, colorless crystals of cerium and other rare-earth potassium sulphates will, after some time, be deposited.

No effervescence should occur when the salt is dissolved in diluted hydrochloric acid (absence of *carbonates*). The solution of the salt (1 in 20) in diluted hydrochloric acid should not respond to the Time-Limit Test for *heavy metals*, omitting the addition of the ammonia water (see Appendix, Test No. 121).

Five Cc. of the solution of the salt (1 in 10) in diluted hydrochloric acid should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

On boiling the salt with potassium hydroxide T.S. and filtering, no precipitate should be produced in the filtrate by the addition of either ammonium chloride T.S. (absence of *aluminum*) or ammonium sulphide T.S. (absence of *zinc*).

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

CETACEUM

Spermaceti

A peculiar, concrete, fatty substance, obtained from the head of the sperm whale, *Physeter macrocephalus* Linné.

White, somewhat translucent, slightly unctuous masses of a scaly, crystalline fracture and a pearly lustre, with a very faint odor and a bland, mild taste. It becomes yellowish and rancid on prolonged exposure to air.

Specific gravity : 0.935 to 0.944 at 25° C. (77° F.), 0.842 at 100° C. (212° F.).

Melting point: 42° to 50° C. (107.6° to 122° F.).

Insoluble in water and nearly so in cold alcohol; soluble in about 50 parts of boiling alcohol; also in ether, chloroform, carbon disulphide, fixed and volatile oils; only slightly soluble in cold petroleum benzin.

An alcoholic solution of Spermaceti is neutral to litmus paper.

If 1 Gm. of Spermaceti be boiled with 1 Gm. of anhydrous sodium carbonate and 50 Cc. of alcohol, and the mixture cooled and filtered, the filtrate, upon being supersaturated with acetic acid, may become turbid, but it should not afford a precipitate (absence of *stearic acid*).

CHARTA SINAPIS

Mustard Paper

Black Mustard, in No. 60 powder, *one hundred grammes* . . .	**100 Gm.**
Rubber, *ten grammes*	**10 Gm.**
Petroleum Benzin,	
Carbon Disulphide, each, *a sufficient quantity*.	

Pack the Black Mustard in a conical percolator, and gradually pour Petroleum Benzin upon it until the percolate ceases to produce a permanent, greasy stain upon blotting paper. Remove the powder from the percolator, and dry it by exposure to the air. Having meanwhile dissolved the Rubber in a mixture of *one hundred cubic centimeters*, each, of Petroleum Benzin and Carbon Disulphide, mix the purified Mustard with a sufficient quantity of the solution to produce a semi-liquid magma, and apply this, by means of a suitable brush, to one side of a piece of rather thick, well-sized paper, so as to cover it completely, and then allow the surface to dry.

A surface of sixty square centimeters should contain about 4 Gm. of Black Mustard deprived of oil.

Before it is applied to the skin, Mustard Paper should be dipped in warm water for about fifteen seconds.

CHIMAPHILA

Chimaphila

The dried leaves of *Chimaphila umbellata* (Linné) Nuttall (Fam. *Ericaceæ*).

Oblanceolate, 2.5 to 5 Cm. long, 8 to 18 Mm. broad, the upper portion coarsely and sharply serrate, acute or somewhat obtuse, the lower wedge-shaped and nearly entire; coriaceous, smooth, and uniformly dark green on the upper surface, paler beneath, the veins being very prominent; odor slight; taste astringent and bitter.

Average dose.— 2 Gm. (30 grains).

CHIRATA

Chirata

The dried plant of *Swertia Chirayita* (Roxburgh) Hamilton (Fam. *Gentianaceæ*).

Smooth; root simple, about 7 Mm. thick near the crown; stem about 1 M. long, externally yellowish or purplish-brown, cylindrical near the base, quadrangular and lightly winged above, with numerous opposite, ascending branches; wood yellowish, thin, enclosing usually a large yellowish easily separable pith; leaves opposite, sessile, ovate-lanceolate, entire, five-nerved, about 6 Cm. long; flowers numerous, panicled, small, with a four-lobed calyx and corolla; capsule ovoid, acute, one-celled, many-seeded; odor slight; taste intensely bitter.

Average dose.— 1 Gm. (15 grains).

CHLORALFORMAMIDUM

Chloralformamide

$C_3H_4Cl_3NO_2 = 190.96$

A crystalline solid $[CCl_3.CH(OH)NH.COH]$, made by the direct union of formamide with anhydrous chloral. It should be kept in amber-colored, well-stoppered vials.

Colorless, lustrous crystals, without odor, and having a somewhat bitter taste.

Soluble in about 18.7 parts of water, and in 1.3 parts of alcohol at 25° C. (77° F.). It is readily soluble in ether, glycerin, acetone, and acetic ether.

When heated with water to 60° C. (140° F.), it is hydrolized, hydrated chloral and formamide being produced.

When heated from 114° to 115° C. (237.2° to 239° F.), it melts, but at a higher temperature it is decomposed.

It is not affected by diluted acids, but it is decomposed on warming with alkali hydroxides, the solution becoming at first turbid, and then clear, while chloroform separates.

If 0.2 Gm. be heated carefully in an open dish, it should not give off inflammable vapors, and it should volatilize without leaving a weighable residue (absence of *inorganic impurities* and distinction from *chloral alcoholate* and *ethyl carbamate*).

One Gm. of Chloralformamide dissolved in 10 Cc. of alcohol should yield a solution which does not redden moistened blue litmus paper (absence of *formic, hydrochloric*, or *other free acids*).

If 1 Gm. of Chloralformamide be dissolved in 10 Cc. of alcohol, the addition of a few drops of silver nitrate T.S. should not at once produce turbidity (absence of *decomposition products*).

Average dose.—1 Gm. (15 grains).

CHLORALUM HYDRATUM

Hydrated Chloral

$C_2HCl_3O + H_2O = 164.12$

[CHLORAL, PHARM. 1890]

A crystalline solid, composed of trichloraldehyde or chloral [$CCl_3.COH$] with the elements of one molecule of water. It should be kept in amber-colored glass-stoppered bottles, in a cool and dark place.

Separate, rhomboidal, colorless and transparent crystals, having an aromatic, penetrating, and slightly acrid odor, and a bitterish, caustic taste; slowly volatilized when exposed to the air.

Freely soluble in water, alcohol, or ether; also in chloroform, benzene, petroleum benzin, carbon disulphide, fixed and volatile oils. It liquefies when triturated with about an equal quantity of camphor, menthol, thymol, or phenol.

When dried and heated to about 58° C. (136.4° F.), it melts, forming a liquid having a specific gravity of about 1.575, which, at a higher temperature, should not evolve inflammable vapors.

Liquefied Hydrated Chloral solidifies to a crystalline mass between 35° and 50° C. (95° and 122° F.).

Hydrated Chloral is decomposed by caustic alkalies, alkaline earths, and ammonia, chloroform and a formate of the base being produced. When warmed with a few drops of aniline and sodium hydroxide T.S., the intensely disagreeable odor of phenyl-isocyanide (isonitril reaction) should be produced.

Hydrated Chloral should be dry, and it should not readily attract moisture in dry air.

A freshly prepared, aqueous solution of Hydrated Chloral (1 in 20) should be neutral to litmus paper, but it gradually acquires an acid reaction. A neutral alcoholic solution remains neutral permanently.

An aqueous solution of Hydrated Chloral (1 in 20), slightly acidulated with nitric acid, should remain unaffected by silver nitrate T.S. (absence of *hydrochloric acid* and *chlorides*).

Average dose.—1 Gm. (15 grains).

CHLOROFORMUM

Chloroform

A liquid consisting of 99 to 99.4 percent., by weight, of absolute Chloroform [$CHCl_3 = 118.45$], and 0.6 to 1 percent. of alcohol. It should be kept in dark amber-colored, well-stoppered bottles, in a cool and dark place.

A heavy, clear, colorless, mobile and diffusible liquid, of a characteristic, ethereal odor, and a burning, sweet taste.

Specific gravity: not below 1.476 at 25° C. (77° F.).

Soluble in about 200 times its volume of cold water, and, in all proportions, in alcohol, ether, benzene, petroleum benzin, and the fixed and volatile oils.

Chloroform is volatile even at a low temperature, and boils at 60° to 61° C. (140° to 141.8° F.). It is not inflammable, but its heated vapor burns with a green flame.

If 10 Cc. of Chloroform be poured upon a piece of clean, odorless filter paper laid flat upon a warmed glass plate, and the plate be rocked from side to side until the liquid is all evaporated, no foreign odor should become perceptible as the last portions disappear from the paper, and the paper should be left odorless.

If 10 Cc. of Chloroform be well shaken with 20 Cc. of distilled water, and the liquid be allowed to separate completely, the water should be neutral to litmus paper, and should not be affected by silver nitrate T.S. (absence of *chlorides*), nor colored by potassium iodide T.S. (absence of *free chlorine*).

If 40 Cc. of chloroform be shaken with 4 Cc. of colorless, concentrated sulphuric acid in a 50 Cc. glass-stoppered cylinder during five minutes, and the liquids be then allowed to separate completely, so that both are transparent, the chloroform should remain colorless, and the acid should appear colorless, or very nearly colorless, when seen in a stratum of not less than 15 Mm. in thickness (absence of *impurities decomposable by sulphuric acid*).

If 2 Cc. of the sulphuric acid, separated from the Chloroform, be diluted with 5 Cc. of distilled water, the liquid should be colorless and clear, and, while hot from the mixing, should be odorless, or give but a faint vinous or ethereal odor (absence of *odorous decomposition products*). When further diluted with 10 Cc. of distilled water, it should remain clear, and should not be affected by silver nitrate T.S. (absence of *chlorinated decomposition compounds*).

Average dose.—0.3 Cc. (5 minims).

CHONDRUS

Chondrus

The dried plant of *Chondrus crispus* (Linné) Lyngbye (Fam. *Gigartinaceæ*).

Usually in light yellow or yellowish-white matted masses; the plant consisting of a slender, somewhat flattened base about one-half the length of the entire frond, which after repeated forking terminates in a number of palmately branching, somewhat enlarged, commonly emarginate or two-lobed segments; translucent, sometimes with fruit bodies embedded near the apex of the segments; somewhat cartilaginous; having a slight sea-weed odor, and a mucilaginous, somewhat saline taste.

One part of Chondrus boiled for ten minutes with 30 parts of water yields a solution which gelatinizes on cooling, and is not colored blue by iodine T.S.

Average dose.—In decoction, 15 Gm. (4 drachms).

CHROMII TRIOXIDUM

Chromium Trioxide

$CrO_3 = 99.34$

[ACIDUM CHROMICUM, PHARM. 1890]

It should contain not less than 90 percent. of pure Chromium Trioxide (chromic acid anhydride). It should be kept in glass-stoppered bottles, and great caution should be observed to avoid bringing it in contact with organic substances, such as cork, tannic acid, sugar, alcohol, collodion, etc., as serious accidents are liable to result.

Small, needle-shaped crystals or rhombic prisms, of a dark purplish-red color and metallic lustre; odorless; destructive to animal and vegetable tissues; deliquescent in moist air.

Very soluble in water, forming an orange-red solution. When brought in contact with alcohol, ether, glycerin, and other organic solvents, decomposition takes place, sometimes with dangerous violence.

When Chromium Trioxide is heated, its color darkens, and finally becomes black, but it is restored on cooling. At 192° to 193° C. (377.6° to 379.4° F.) it fuses to a reddish-brown liquid, which, on cooling, forms a dark red, brittle mass (often enclosing cavities filled with crystals), furnishing a scarlet powder. Above 250° C. (482° F.) it begins to decompose into green chromic oxide and free oxygen, and, after protracted heating, leaves a residue of pure chromic oxide, which should yield nothing soluble in water.

When warmed with hydrochloric acid, chlorine is evolved.

A solution of 1 Gm. of Chromium Trioxide in 100 Cc. of water, previously acidulated with a few Cc. of hydrochloric acid, should not be rendered turbid on the addition of 1 Cc. of barium chloride T.S. (absence of *sulphuric acid*).

If 1 Gm. of Chromium Trioxide be dissolved in 100 Cc. of water, then 8.3 Cc. (8.28 Cc.) of this solution, when measured into a glass-stoppered bottle (of about 200 Cc. capacity), mixed with 2 Cc. of hydrochloric acid and about 1 Gm. of potassium iodide, after securely closing and shaking for a few minutes, should require, after diluting with 100 Cc. of water and adding 5 Cc. of starch T.S., not less than 22.5 Cc. of tenth-normal sodium thiosulphate V.S. to change the deep blue color to a light green (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 4 percent. of pure Chromium Trioxide).

CHRYSAROBINUM

Chrysarobin

$C_{30}H_{26}O_7 = 494.46$

A neutral principle extracted from Goa Powder, a substance found deposited in the wood of *Vouacapoua Araroba* (Aguiar) Druce (Fam. *Leguminosæ*). Chrysarobin should be preserved in amber-colored, glass-stoppered vials.

A pale orange-yellow, micro-crystalline powder, tasteless, odorless, and irritating to the mucous membrane.

Specific gravity: 0.920 to 0.922.

Soluble in 4812 parts of water, 308 parts of alcohol, 25 parts of benzene, 18 parts of chloroform, 114 parts of ether, 30 parts of amyl alcohol, and 230 parts of carbon disulphide at 25° C. (77° F.); soluble in 2170 parts of water at 80° C.

(176° F.), and in 275 parts of alcohol at 60° C. (140° F.); soluble in dilute or concentrated solutions of potassium hydroxide, forming a red-colored liquid, with green fluorescence.

Chrysarobin, when heated, contracts and forms a dark mass at 148° C. (298.4° F.), and melts at 157° C. (314.6° F.). When ignited it is partly sublimed and finally entirely consumed.

In sulphuric acid it dissolves, forming a deep red solution. On pouring this liquid into water, Chrysarobin is deposited unchanged.

On mixing 0.001 Gm. of Chrysarobin with 2 drops of fuming nitric acid, a red-colored mixture is produced, which turns violet on the addition of a few drops of ammonia water (distinction from *chrysophanic acid*, which produces a yellow-colored liquid).

On shaking Chrysarobin with lime water for a few minutes, the liquid acquires a violet color (distinction from *chrysophanic acid*, which produces a yellow-colored liquid).

On adding a crystal of potassium dichromate to a solution of Chrysarobin in sulphuric acid, the red color is changed at first to green, then to purple, and finally to brown.

Average dose.—0.030 Gm. = 30 milligrammes (½ grain).

CIMICIFUGA

Cimicifuga

The dried rhizome and roots of *Cimicifuga racemosa* (Linné) Nuttall (Fam. *Ranunculaceæ*).

Rhizome horizontal in growth, 2 to 15 Cm. long, 1 to 2.5 Cm. thick, with numerous thick, erect or ascending branches about 2.5 Cm. long, each terminated by a deep, cup-shaped scar; roots numerous, brittle, obtusely quadrangular, and about 2 Mm. thick; the whole brownish-black; fracture of rhizome horny, of root short, the rhizome exhibiting a rather large pith, surrounded by numerous whitish, radially sublinear xylem plates; bark thin, firm; the roots having a thick bark and usually a four-rayed wood; odor slight but heavy; taste bitter and acrid.

Average dose.—1 Gm. (15 grains).

CINCHONA

Cinchona

The dried bark of *Cinchona Ledgeriana* Moens, *Cinchona Calisaya* Weddell, *Cinchona officinalis* Linné, and of hybrids of these with other species of Cinchona (Fam. *Rubiaceæ*). It should yield not less than 5 percent. of total anhydrous cinchona alkaloids, and at least 4 percent. of anhydrous ether-soluble alkaloids when assayed by the process given below.

In quills or curved pieces of variable size, usually 2 or 3, sometimes 5 Mm. thick; externally gray, rarely brownish-gray, with numerous intersecting transverse and longitudinal fissures, which have nearly vertical sides; the outer bark may be absent, the color externally being then cinnamon-brown; inner surface light cinnamon-brown, finely striate; fracture of the outer bark short and granular, of the inner finely splintery; powder light brown or yellowish-brown; odor slight, aromatic; taste bitter and somewhat astringent.

Assay of Cinchona

Cinchona, in No. 80 (or finer) powder, *fifteen grammes* . . . . **15 Gm.**
Ether, sp. gr. not above 0.720 at 25° C. (77° F.),
Chloroform,
Ammonia Water,
Distilled Water,
Normal Sulphuric Acid V.S., each, *a sufficient quantity.*

Introduce the Cinchona into an Erlenmeyer flask or bottle of about 400 Cc. capacity, and add a mixture of 250 Cc. of ether and 50 Cc. of chloroform; then insert the stopper securely, shake the flask vigorously, and allow it to stand for ten minutes. Then add 10 Cc. of ammonia water, and allow it to stand for five hours, shaking at frequent intervals (or continuously with the aid of a mechanical shaker). Next add 15 Cc. of distilled water, shake the flask vigorously, and allow it to stand for a few minutes, so as to cause the powder to settle readily. When the supernatant fluid is quite clear, decant into a measuring flask or cylinder exactly 200 Cc. of the supernatant liquid (representing 10 Gm. of Cinchona), transfer this to a separator and add 15 Cc. of normal sulphuric acid V.S., or sufficient to make the liquid distinctly acid. Shake the separator vigorously for one minute, and allow the two layers of liquid to separate completely. Draw off the lower aqueous layer into a flask. Then add 5 Cc. of normal sulphuric acid V.S. and 5 Cc. of distilled water to the separator and shake it vigorously for about one minute, allow the liquids to separate as before, and again draw off the lower aqueous layer into the flask. Repeat the operation, using 5 Cc. of distilled water in the separator (without acid), drawing off the aqueous liquid into the flask. Filter the combined acid liquids into a measuring cylinder, and wash the filter and flask with enough distilled water to make the contents of the cylinder measure exactly 50 Cc. Pour half (25 Cc.) of the acid liquid into a separator marked No. 1, and the remaining half (25 Cc.) into another separator marked No. 2, which set aside.

I. For Anhydrous Cinchona Alkaloids.—To separator No. 1 (see above) add 25 Cc. of a mixture of chloroform 3 volumes and ether 1 volume, also 5 Cc. of ammonia water, or sufficient to render the liquid alkaline. Insert the stopper and shake the separator carefully for one minute, and then draw off the lower layer into a tared flask or beaker. Add 20 Cc. more of the chloroform-ether mixture to the separator, insert the stopper, and shake the liquid carefully for one minute, again drawing off the lower layer into the tared flask. Repeat the operation with 10 Cc. of chloroform, and draw this off into the tared flask. Evaporate the chloroform-ether solutions in the tared flask or beaker slowly and carefully to dryness on a water-bath. Add 3 Cc. of ether to the dry residue, and again evaporate to dryness. Then place the flask or beaker in an air-bath and heat at 110° C. (230° F.) until the weight after cooling remains constant. This weight in grammes multiplied by 20 will give the percentage of anhydrous cinchona alkaloids (total alkaloids) in the Cinchona.

II. For Ether-Soluble Alkaloids.—To separator No. 2 (see above), containing the other 25 Cc. of acid liquid, add 25 Cc. of ether and 5 Cc. of ammonia water, or sufficient to render the liquid alkaline. The temperature of the liquid should be kept below 20° C. (68° F.), by cooling it, if necessary. Shake the separator moderately for two minutes, and allow the liquid to stand for ten minutes at 15° C. (59° F.); after the liquids have separated, draw off and reject the lower aqueous layer and transfer the ethereal liquid to a tared beaker. Add 5 Cc. more of ether to the separator, rinse carefully, and add the rinsings to the tared beaker. Evaporate the ether carefully by the aid of a water-bath, dry the beaker and contents in an air-bath at 110° C. (230° F.) for two hours, cool, and weigh. This weight in grammes multiplied by 20 gives the percentage of the anhydrous ether-soluble alkaloids contained in the Cinchona.

NOTE.—Ether-soluble alkaloids include quinine, quinidine, and cinchonidine.

Average dose.—1 Gm. (15 grains).

CINCHONA RUBRA

Red Cinchona

The dried bark of *Cinchona succirubra* Pavon (Fam. *Rubiaceæ*), or of its hybrids, yielding not less than 5 percent. of anhydrous cinchona alkaloids when assayed by the process given for these alkaloids under Cinchona.

In quills or curved pieces of variable size, the bark 2 to 5 Mm. thick; externally gray or grayish-brown, more or less rough from longitudinal rows of warts, or from warty ridges which are sometimes fissured, the transverse fissures rarely numerous or much intersected, and having their sides sloping; inner surface reddish or orange-brown, distinctly striate; fracture short and granular in the outer, shortly and rather coarsely splintery in the inner bark; slightly odorous; taste bitter and astringent; powder reddish-brown.

Average dose.—1 Gm. (15 grains).

CINCHONIDINÆ SULPHAS

Cinchonidine Sulphate

$(C_{19}H_{22}N_2O)_2.H_2SO_4 + 3H_2O = 735.05$

The neutral sulphate $[SO_2(OH)_2.(C_{19}H_{22}N_2O)_2 + 3H_2O]$ of an alkaloid obtained from the bark of several species of Cinchona.

White, glistening, silky needles or prisms, permanent in the air, odorless, having a very bitter taste. When crystallized from dilute solutions, it contains six molecules of water of crystallization, and when from concentrated solutions, three molecules.

Soluble in 63 parts of water, 72 parts of alcohol, 4400 parts of ether, and in 900 parts of chloroform at 25° C. (77° F.); soluble in 21 parts of water at 80° C. (176° F.), and in 32 parts of alcohol at 60° C. (140° F.).

When heated to 100° C. (212° F.), the salt loses its water of crystallization, and at 203° C. (397.4° F.), it darkens, and then melts at 205.3° C. (401.5° F.). At a higher temperature it ignites and is consumed without leaving a residue.

The aqueous solution is neutral or only faintly alkaline to phenolphthalein T.S. or litmus T.S., and is lævogyrate.

Its aqueous solution yields with barium chloride T.S. a white precipitate, insoluble in hydrochloric acid.

On adding ammonia water to the aqueous solution of the salt, a white precipitate (cinchonidine) is produced, which is but slightly soluble in ammonia, but which, when freshly precipitated, dissolves in 10 parts of ether, the greater part afterwards separating in crystals.

If sulphuric acid be added to a small quantity of the salt, not more than a faintly yellowish color should be developed (limit of *readily carbonizable organic impurities*). Upon adding to this liquid a crystal of potassium dichromate, a yellowish-green color is produced, which gradually changes to grass-green.

If 1 Gm. of the salt be dried at 100° C. (212° F.) until it ceases to lose weight, the residue, cooled in a desiccator, should weigh not less than 0.920 Gm. (absence of an *undue amount of water*).

A solution of the salt (1 in 1000) in diluted sulphuric acid should not exhibit more than a faint blue fluorescence (absence of more than traces of *quinine* or *quinidine sulphates*).

If 0.5 Gm. of the salt be macerated, with frequent agitation, at the ordinary temperature, with 20 Cc. of water, 0.5 Gm. of potassium and sodium tartrate then added, the maceration continued, under repeated agitation, for one hour at 15° C. (59° F.), and the mixture filtered, the addition of 1 drop of ammonia water to the filtrate should not produce more than a slight turbidity (absence of more than small quantities of *cinchonine* or *quinidine sulphates*).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

CINCHONINÆ SULPHAS

Cinchonine Sulphate

$(C_{19}H_{22}N_2O)_2.H_2SO_4 + 2H_2O = 717.17$

The neutral sulphate $[SO_2(OH)_2.(C_{19}H_{22}N_2O)_2 + 2H_2O]$ of an alkaloid obtained from the bark of several species of Cinchona.

White, hard, lustrous, prismatic crystals; odorless, permanent in the air, and having a bitter taste. At 100° C. (212° F.) it loses its water of crystallization. If crystallized from water it will contain two, and if from alcohol, one, molecule of water of crystallization. Its aqueous solution should not show fluorescence.

Soluble in 58 parts of water, 10 parts of alcohol, 2300 parts of ether, and in 69 parts of chloroform at 25° C. (77° F.); soluble in 32 parts of water at 80° C. (176° F.), and in 5.2 parts of alcohol at 60° C. (140° F.).

It melts at 198.5° C. (389.5° F.), and leaves no residue on incineration.

Its aqueous solution is neutral to litmus paper, and is dextrogyrate.

An aqueous solution of Cinchonine Sulphate (1 in 100) yields with barium chloride T.S. a white precipitate, insoluble in hydrochloric acid.

One Gm. of the salt dried to constant weight at 100° C. (212° F.) should weigh not less than 0.95 Gm. (absence of an *undue amount of water*).

A solution of the salt (1 in 1000) in diluted sulphuric acid should not exhibit more than a faint blue fluorescence (limit of *quinine* or *quinidine sulphates*).

If 1 part of the powdered salt be macerated with frequent agitation in 80 parts of chloroform, at ordinary temperatures, it should be wholly, or almost wholly, dissolved (limit of *quinine* or *cinchonidine sulphates*).

The salt should not impart more than a faintly yellowish tinge to sulphuric acid (limit of *readily carbonizable, organic impurities*).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

CINNALDEHYDUM

Cinnamic Aldehyde

$C_9H_8O = 131.07$

An aldehyde obtained from oil of cinnamon or prepared synthetically, containing not less than 95 percent. of pure Cinnamic Aldehyde $[C_6H_5.CH{:}CH.COH]$. It is nearly identical with the oil distilled from Cassia Cinnamon, and should be kept in small, amber-colored, well-stoppered bottles.

A colorless liquid, having a cinnamon-like odor and a burning, aromatic taste.

Specific gravity: about 1.047 at 25° C. (77° F.). Optically inactive.

It boils at about 250° C. (482° F.), with partial decomposition.

Cinnamic Aldehyde should partially solidify when the temperature is reduced by a freezing mixture of ice and salt, and should melt again at —7.5° C. (18.5° F.).

It is sparingly soluble in water, soluble in all proportions in alcohol, ether, and fixed and volatile oils.

If the looped end of a piece of clean copper wire be held in a non-luminous flame until it glows, then cooled, and the loop dipped into Cinnamic Aldehyde, ignited, and held so that the liquid burns outside of the flame, then if the loop be slowly brought in contact with the lower outer edge of the flame, no green tinge should be discernible (absence of *chlorinated products*).

Assay of Cinnamic Aldehyde

Introduce into a counterpoised 150 Cc. flask, by means of a pipette, 12 drops of Cinnamic Aldehyde, and note the exact weight; add 5 Cc. of distilled water and a few drops of rosolic acid T.S., and then neutralize the solution exactly by the cautious addition of tenth-normal sodium hydroxide V.S. Add 50 Cc. of a solution of sodium sulphite (1 in 5), and immerse the flask in a water-bath containing boiling water. From a burette add just sufficient half-normal hydrochloric acid V.S. to maintain the neutrality of the mixture, keeping the flask continuously heated and frequently agitated, and adding a drop or two of rosolic acid T.S. When a permanent condition of neutrality is reached, note the number of cubic centimeters of the half-normal hydrochloric acid V.S. consumed. Carry out a blank test identical with the foregoing, except that the Cinnamic Aldehyde is omitted, and note the amount of half-normal hydrochloric acid V.S. consumed.

Subtract the number of cubic centimeters required in the blank test from the number required in the original test; each Cc. of this difference corresponds to 0.033 Gm. of Cinnamic Aldehyde. To find the percentage, multiply the above difference by 0.033 and the product by 100, and divide by the weight of the Cinnamic Aldehyde taken.

Average dose.— 0.05 Cc. (1 minim).

CINNAMOMUM SAIGONICUM

Saigon Cinnamon

The bark of an undetermined species of *Cinnamomum* (Fam. *Lauraceæ*).

In quills about 15 Cm. long, and 10 to 15 Mm. in diameter, the bark 2 or 3 Mm. thick; outer surface gray or light grayish-brown with whitish patches, more or less rough from numerous warts and some transverse ridges and fine longitudinal wrinkles; the inner surface cinnamon-brown or dark brown, granular and slightly striate; fracture short, granular, in the outer layer cinnamon-colored, having near the cork numerous whitish striæ forming an almost uninterrupted line; odor agreeably aromatic; taste sweet, warmly aromatic, somewhat astringent.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

CINNAMOMUM ZEYLANICUM

Ceylon Cinnamon

The inner bark of the shoots of *Cinnamomum zeylanicum* Breyne (Fam. *Lauraceæ*).

Long, closely rolled quills, composed of eight or more thin layers of bark; pale yellowish-brown; outer surface smooth, marked with wavy lines of bast-bundles; inner surface striate; fracture short-splintery; odor agreeably aromatic; taste sweet and warmly aromatic. The yield of ash, when incinerated, should not be over 4 percent.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

COCA

Coca

The dried leaves of *Erythroxylon Coca* Lamarck (Fam. *Erythroxylaceæ*), known commercially as Huanuco Coca, or of *E. Truxillense* Rusby, known commercially as Truxillo Coca, yielding, when assayed by the process given below, not less than 0.5 percent. of the ether-soluble alkaloids of Coca.

Huanuco Coca.—Greenish-brown to clear brown, smooth and slightly glossy, thickish and slightly coriaceous, stoutly and very shortly petioled; blade 2.5 to 7.5 Cm. long and nearly elliptical, with a very short and abruptly narrowed basal portion and a short point, the margin entire; midrib marked above by a slight ridge, very prominent underneath, the remaining venation rather obscure, especially above; underneath, a conspicuous line of collenchyma tissue runs longitudinally on either side of the midrib and about one-third of the distance between it and the margin, the enclosed areola being of a slightly different color from the adjacent surface; odor characteristic; taste bitterish, faintly aromatic, followed by a numbness of the tongue, lips, and fauces.

Truxillo Coca.—Pale green, thin, brittle and usually much broken, smooth but not shining, shortly and stoutly petioled; blade 1.6 to 5 Cm. long and one-third to one-half as broad, obovate to oblanceolate, narrowed from near the middle into the petiole, usually with a slight projecting point at the summit, the margin entire; underneath two irregular lines of collenchyma tissue, usually incomplete or obscure, and frequently wanting, run beside the midrib at about one-third the distance from it to the margin; odor more tea-like than that of Huanuco Coca; taste and numbing effect similar.

Assay of Coca

Coca, in No. 60 powder, *ten grammes* . . . . 10 Gm.
Chloroform,
Ether,
Normal Sulphuric Acid V.S.,
Ammonia Water,
Distilled Water,
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Cochineal or **Iodeosin T.S.**, each, *a sufficient quantity.*

Place the Coca in an Erlenmeyer flask, add 50 Cc. of a mixture of chloroform 1 volume and ether 4 volumes and insert the stopper securely. Allow the flask to stand ten minutes, then add 2 Cc. of ammonia water mixed with 3 Cc. of distilled water, and shake the flask well, at frequent intervals, during one hour. Then transfer as much as possible of the contents of the flask to a small percolator which has been provided with a pledget of cotton packed firmly in the neck, and inserted in a separator containing 6 Cc. of normal sulphuric acid V.S., diluted with 20 Cc. of distilled water. When the liquid has passed through the cotton, pack the Coca firmly in the percolator with the aid of a glass rod, and, having rinsed the flask with 10 Cc. of chloroform-ether mixture, transfer the remaining contents of the flask to the percolator by the aid of several small portions (5 Cc.) of a chloroform-ether mixture, using the same proportions as before, and continue the percolation with successive small portions of the same liquid (in all 50 Cc.). Next, shake the separator well for one minute, after securely inserting the stopper, and when the liquids have completely separated, draw off the acid liquid into another separator. Add to the chloroform-ether mixture 10 Cc. of a sulphuric acid mixture, using the same proportions as before, agitate well and again draw off the acid liquid. Repeat this operation once more, drawing off the acid solution as before into the second separator, introduce a small piece of red litmus paper, add ammonia water until the liquid is distinctly alkaline, and shake out with 3 successive portions of ether (25, 20, and 15 Cc.). Collect the ether-solutions in a beaker, place it on a water-bath filled with warm water, and allow the ether to evaporate entirely. Dissolve the residue in 3 Cc. of ether, and let this also evaporate completely. To the alkaloidal residue add 4 Cc. of tenth-normal sulphuric acid V.S. and 5 drops of cochineal or iodeosin T.S., then titrate the excess of acid with fiftieth-normal potassium hydroxide V.S. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract this number from 4 (the 4 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.03 and this product by 10, to obtain the percentage of ether-soluble alkaloids contained in the Coca.

Average dose.— 2 Gm. (30 grains).

COCAINA

Cocaine

$C_{17}H_{21}NO_4 = 300.92$

An alkaloid [$C_8H_{13}(C_6H_5CO)NO.COOCH_3$] obtained from several varieties of Coca.

Large, colorless, four-sided or six-sided, monoclinic prisms, having a slightly bitter taste, and producing on the tongue a temporary numbness.

Soluble in 600 parts of water, 5 parts of alcohol, and in 3.8 parts of ether at 25° C. (77° F.); very soluble in chloroform and warm alcohol; soluble in 260 parts of water at 80° C. (176° F.); soluble in benzene, carbon disulphide, ethyl acetate, in about 14 parts of oil of turpentine, and in about 12 parts of olive oil; insoluble in glycerin.

It melts at 98° C. (208.4° F.), and should leave no residue on ignition.

If an alcoholic solution of Cocaine be carefully neutralized with hydrochloric acid, and the solution evaporated to dryness, the residue should respond to the reactions and tests given under *Cocainæ Hydrochloridum*.

Average dose.— 0.030 Gm. = 30 milligrammes (½ grain).

COCAINÆ HYDROCHLORIDUM

Cocaine Hydrochloride

$C_{17}H_{21}NO_4.HCl = 337.10$

[COCAINÆ HYDROCHLORAS, PHARM. 1890]

The neutral hydrochloride [$HCl.C_8H_{13}(C_6H_5CO)NO.COOCH_3$] of an alkaloid obtained from several varieties of Coca.

Colorless, transparent, monoclinic prisms, flaky, lustrous leaflets or a white crystalline powder; permanent in the air, containing no water of crystallization: odorless; of a saline, slightly bitter taste, and producing on the tongue a tingling sensation followed by numbness of several minutes' duration.

Soluble in 0.4 part of water, 2.6 parts of alcohol, and in 18.5 parts of chloroform at 25° C. (77° F.); soluble in 0.1 part of water at 80° C. (176° F.), and in 1.4 parts of alcohol at 60° C. (140° F.); insoluble in benzene, petroleum benzin, and ether.

It melts at about 189.9° C. (373.8° F.). Minute quantities of impurities may reduce the melting point to 180° C. (356° F.) or less. It leaves no residue on incineration.

Its aqueous solution is neutral to litmus paper, and is lævogyrate.

If silver nitrate T.S. be added to the aqueous solution of the salt (1 in 100), a white precipitate is produced, which is insoluble in nitric acid.

On adding 5 drops of a solution of chromium trioxide (1 in 20) to 5 Cc. of a solution of Cocaine Hydrochloride (1 in 50), a yellow precipitate will be produced, which redissolves on shaking; on now adding 1 Cc. of hydrochloric acid, a permanent, orange-colored, crystalline precipitate will be formed.

On adding a solution of potassium chromate (1 in 20) to a hydrochloric acid solution of the salt, orange-yellow leaflets of cocaine chromate are precipitated.

If mercuric chloride T.S. be added to an aqueous solution of the salt, a white flocculent precipitate is produced.

Cocaine Hydrochloride is not colored by cold sulphuric acid, but if a crystal be heated with sulphuric acid, in a test-tube, vapors are produced, from which, benzoic acid is deposited on cooling.

If three drops of palladous chloride T.S., with 3 Cc. of chlorine water, be added to 3 drops of an aqueous solution of the salt (1 in 20), a red precipitate is produced.

When 0.01 Gm. of the salt is dissolved in 2 drops of water, the addition of 1 Cc. of a solution of potassium permanganate (1 in 30) produces a violet precipitate, which appears brownish-violet when collected on a filter.

A crystal of the salt dissolved in alcohol yields when stirred with a piece of potassium hydroxide an odor of ethyl benzoate.

If 0.1 Gm. of the salt be dissolved in 5 Cc. of distilled water containing 3 drops of diluted sulphuric acid, the addition to this solution of 3 drops of tenth-normal potassium permanganate V.S. will produce a violet color, which should not fade in half an hour (limit of *cinnamyl-cocaine*).

If 0.1 Gm. of the salt be dissolved in 85 Cc. of cold distilled water, in a beaker, and 4 drops of ammonia water added, and the solution stirred vigorously for fifteen minutes, with occasional rubbing of the sides of the beaker with a stirring rod, a crystalline precipitate of cocaine should be formed, and the supernatant liquid should be perfectly clear (limit of *isatropyl-cocaine*). The presence of 0.5 percent. of isatropyl-cocaine will prevent the formation of nearly all of the precipitate, and will cause the supernatant liquid to be opalescent.

Average dose.—0.030 Gm. 30 milligrammes (½ grain).

COCCUS

Cochineal

The dried female insect, *Pseudococcus cacti* (Linné) Burmeister.

About 5 Mm. long, somewhat oblong and angular in outline, flat and concave beneath, convex above; externally purplish-gray or purplish-black; transversely wrinkled; easily pulverizable, yielding a dark red powder; odor faint; taste slightly bitter.

The coloring matter is soluble in water, alcohol, or ammonia water, slightly soluble in ether, insoluble in fixed and volatile oils; alkalies change the color to purple. Ash not more than 6 percent.

CODEINA

Codeine

$C_{18}H_{21}NO_3 + H_2O = 314.83$

An alkaloid [$C_{17}H_{18}(CH_3)NO_3 + H_2O$] obtained from Opium, or prepared from morphine by methylation. It should be kept in well-stoppered, amber-colored vials.

White, or nearly translucent, orthorhombic prisms, octahedral crystals, or a crystalline powder; odorless, and having a faintly bitter taste; slightly efflorescent in warm air.

Soluble in 120 parts of water, 1.6 parts of alcohol, 12.5 parts of ether, and 0.66 part of chloroform at 25° C. (77° F.); soluble in 59 parts of water at 80° C. (176° F.), and in 0.92 part of alcohol at 60° C. (140° F.).

At 100° C. (212°F.) it loses its water of crystallization, and melts at 154.9° C. (310.8° F.). When heated in an insufficient amount of water for complete solution, it melts to oily drops, which crystallize on cooling. It leaves no residue on incineration.

Its aqueous solution is alkaline to litmus paper, and is lævogyrate.

Sulphuric acid (free from nitrous compounds) produces either no color or a slight pinkish tint, which disappears within two minutes, but on heating, a violet color is developed. (The presence of nitrous compounds causes a pink color in the cold).

Sulphuric acid containing a trace of ferric chloride produces with Codeine a violet-blue color; sulphuric acid heated, with a drop of nitric acid added, gives a blood-red color; sulphuric acid containing a trace of selenous acid produces a green color, changing rapidly to blue, and then slowly back to grass-green (with morphine it gives a blue color, changing to green, and then to brown); sulphuric acid and Codeine develop no color, but on adding a drop of solution of formaldehyde a violet-blue color is produced (morphine giving an intense purple color).

On dissolving a small crystal of potassium ferricyanide in 10 Cc. of water, adding 1 drop of ferric chloride T.S., and then 1 Cc. of Codeine solution (1 in 100), no blue color should be produced at once (absence of *morphine*).

If 1 drop of a diluted nitric acid solution (1 drop in 200 Cc. of water) be added to a solution of 0.03 Gm. of Codeine in 2 Cc. of sulphuric acid, a bluish-red tint, gradually changing to blue, will be developed.

On sprinkling 0.05 Gm. of Codeine upon 2 Cc. of nitric acid (sp. gr. 1.200) the crystals will turn red, but the acid will acquire only a yellow color (difference from, and absence of, *morphine*).

Average dose.— 0.030 Gm. = 30 milligrammes ($\frac{1}{2}$ grain).

CODEINÆ PHOSPHAS

Codeine Phosphate

$C_{18}H_{21}NO_3.H_3PO_4 + 2H_2O = 430.0$

The phosphate [$PO(OH)_3(C_{17}H_{18}(CH_3)NO_3) + 2H_2O$] of an alkaloid obtained from Opium, or prepared from morphine by methylation. It should be kept in well-stoppered, amber-colored vials.

Fine, white, needle-shaped crystals, or a crystalline powder, without odor, and having a bitter taste. It frequently crystallizes with one and a half molecules of water of crystallization.

Soluble in 2.25 parts of water, 261 parts of alcohol, 1340 parts of ether, and in 6620 parts of chloroform at 25° C. (77° F.); soluble in 0.46 part of water at 80° C. (176° F.), and in 97 parts of alcohol at 60° C. (140° F.).

At 100° C. (212° F.) it loses all of its water of crystallization; above 200° C. (392° F.) it becomes darker in color, and at 235° C. (455° F.) melts to a brown liquid, which rapidly volatilizes.

Its aqueous solution reddens blue litmus paper.

If silver nitrate T.S. be added to its aqueous solution, a yellow precipitate is produced, which is soluble in diluted nitric acid and in ammonia water.

Sulphuric acid (free from nitrous compounds) produces either no color or a slight pinkish tint, which disappears within two minutes; sulphuric acid containing a trace of ferric chloride produces a violet-blue color; sulphuric acid containing a trace of selenous acid gives a green color, changing rapidly to blue, and then slowly back to grass-green (with morphine it gives a blue color, changing to green, and then to brown). Sulphuric acid and a drop of solution of formaldehyde produce a violet-blue color (morphine an intense purple).

On dissolving a small crystal of potassium ferricyanide in 10 Cc. of water, adding 1 drop of ferric chloride T.S., and then 1 Cc. of Codeine Phosphate solution (1 in 100), no blue color should be produced at once (absence of *morphine*).

If 0.2 Gm. of Codeine Phosphate be dissolved in 5 Cc. of water and 3 Cc. of potassium hydroxide T.S., and the solution shaken out successively with three portions of chloroform (5 Cc. each), the combined chloroformic solutions, evaporated to dryness in a tared dish, should yield not less than 0.13 Gm. of codeine.

Average dose.— 0.030 Gm. = 30 milligrammes ($\frac{1}{2}$ grain).

CODEINÆ SULPHAS

Codeine Sulphate

$(C_{18}H_{21}NO_3)_2.H_2SO_4 + 5H_2O = 780.65$

The sulphate $[SO_2(OH)_2.(C_{17}H_{18}(CH_3)NO_3)_2 + 5H_2O]$ of an alkaloid obtained from Opium, or prepared from morphine by methylation. It should be kept in well-stoppered, amber-colored vials.

Long, glistening, white, needle-shaped crystals, rhombic prisms, or a crystalline powder, efflorescing in the air, odorless, and having a bitter taste.

Soluble in about 30 parts of water, and 1035 parts of alcohol at 25° C. (77° F.); insoluble in chloroform and ether; soluble in 6.25 parts of water at 80° C. (176° F.), and in 340 parts of alcohol at 60° C. (140° F.).

The salt loses its water of crystallization at 100° C. (212° F.); chars, decomposes, and partially volatilizes above 200° C. (392° F.), without melting; the residue melts at about 278° C. (532.4° F.).

Its aqueous solution (1 in 20) is neutral or faintly acid to litmus paper.

If barium chloride T.S. be added to an aqueous solution of the salt, a white precipitate is produced, which is insoluble in hydrochloric acid.

Sulphuric acid (free from nitrous compounds) produces either no color or a slight pinkish tint, which disappears within two minutes, when added to Codeine Sulphate, but on heating, a violet color is produced; sulphuric acid heated, with a drop of nitric acid added, gives a blood-red color; sulphuric acid containing a trace of selenous acid produces a green color, changing rapidly to blue, and then slowly back to grass-green (with morphine sulphate it gives a blue color, changing to green and then to brown); sulphuric acid and Codeine Sulphate give no color, but on adding a drop of solution of formaldehyde, a violet-blue color is produced (morphine sulphate yielding an intense purple color).

If 1 drop of a diluted nitric acid solution (1 drop in 200 Cc. of water) be added to 2 Cc. of a solution of 0.1 Gm. of Codeine Sulphate in 6 Cc. of sulphuric acid, a bluish-red tint, gradually changing to blue, will be developed.

On dissolving a small crystal of potassium ferricyanide in 10 Cc. of water, adding 1 drop of ferric chloride T.S., and then 1 Cc. of Codeine Sulphate solution (1 in 100), no blue color should be produced at once (absence of *morphine*).

Average dose.—0.030 Gm. = 30 milligrammes ($\frac{1}{2}$ grain).

COLCHICI CORMUS

Colchicum Corm

[COLCHICI RADIX, PHARM. 1890]

The dried corm of *Colchicum autumnale* Linné (Fam. *Liliaceæ*), yielding, when assayed by the process given below, not less than 0.35 percent. of colchicine.

Ovoid, somewhat compressed laterally, and with a groove on one side, or more commonly in transverse, reniform, or longitudinal, ovate slices; externally brownish and finely wrinkled; internally whitish, with numerous circular groups of fibrovascular bundles, giving the surfaces of the transverse sections a papillose appearance; fracture short, mealy; odor slight; taste sweetish, bitter, and somewhat acrid.

Assay of Colchicum Corm

Colchicum Corm, in No 60 powder, *ten grammes*	**10 Gm.**
Ether,	
Chloroform,	
Alcohol,	
Ammonia Water,	
Distilled Water, each, *a sufficient quantity.*	

Introduce the Colchicum Corm into a 200 Cc. Erlenmeyer flask, and add to it 100 Cc. of a mixture of 77 Cc. of ether, 25 Cc. of chloroform, 8 Cc. of alcohol, and 3 Cc. of ammonia water, insert the stopper securely, and macerate, with frequent shaking, for twelve hours (or preferably for four hours in a mechanical shaker). Filter a sufficient quantity of the liquid into a measuring cylinder until 50 Cc. of filtrate (representing 5 Gm. of Colchicum Corm) have been obtained; then transfer this to a beaker or dish, and evaporate it nearly to dryness by applying a gentle heat. Dissolve the residue in 10 Cc. of ether, add 5 Cc. of water, stir well, and heat gently until the ether has evaporated. After cooling, filter the aqueous solution into a small separator, retaining the insoluble matter as much as possible in the beaker or dish. Redissolve the residue in a little ether, add 5 Cc. of water, and proceed as before. Wash the container and filter with a little water, and shake the combined aqueous solutions well for one minute with 15 Cc. of chloroform. Draw off the chloroform, after perfect separation, into a beaker, and again shake out the aqueous liquid successively with three portions of 10 Cc. each of chloroform, collecting these solutions in the beaker. Evaporate the chloroform completely; dissolve the residue in a little alcohol, evaporate the latter, redissolve the residue in 5 Cc. of ether, add 5 Cc. of water, and stir the liquid for a few seconds. Then evaporate the ether on a water-bath containing warm water, and filter the remaining aqueous liquid through a small wetted filter into a separator, washing the dish and filter with 5 Cc. of water, and adding the washings to the separator. Shake out the aqueous liquid with 15 Cc. of chloroform, and when the liquids have separated, draw off the chloroform into a tared flask. Repeat the shaking out successively with three portions of 10 Cc. of chloroform and add each to the tared flask. Evaporate the chloroform completely, dissolve the residue in a little alcohol, evaporate the latter, redissolve the residue in alcohol, evaporate the alcohol as before, and dry the residue at 100° C. (212° F.) until the weight, after cooling, remains constant. The weight of the residue multiplied by 20 gives the percentage of colchicine in the Colchicum Corm.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

COLCHICI SEMEN

Colchicum Seed

The seed of *Colchicum autumnale* Linné (Fam. *Liliaceæ*), yielding, when assayed by the process given below, not less than 0.45 percent. of colchicine.

Subglobular, about 2 Mm. in diameter, very slightly pointed at the hilum; externally reddish-brown, finely pitted; internally whitish; tough and of almost bony hardness; nearly inodorous; taste bitter and somewhat acrid.

Assay of Colchicum Seed

Colchicum Seed, in No. 60 powder, *ten grammes* . . . . . . **10 Gm.**
Ether,
Chloroform,
Alcohol,
Ammonia Water,
Distilled Water, each, *a sufficient quantity.*

Introduce the Colchicum Seed into a 200 Cc. Erlenmeyer flask, and add to it 100 Cc. of a mixture of 77 Cc. of ether, 25 Cc. of chloroform, 8 Cc. of alcohol, and 3 Cc. of ammonia water, insert the stopper securely, and macerate, with frequent shaking, for twelve hours (or preferably for four hours in a mechanical shaker). Filter a sufficient quantity of the liquid into a measuring cylinder until 50 Cc. of filtrate (representing 5 Gm. of Colchicum Seed) have been obtained; then transfer this to a beaker or dish, and evaporate it nearly to dryness by applying a very gentle heat. Dissolve the residue in 10 Cc. of ether, add 5 Cc. of water, stir well, and heat gently until the ether has evaporated. After cooling, filter the aqueous solution into a small separator, retaining the insoluble matter as much as possible in the beaker or dish. Redissolve the residue in a little ether, add 5 Cc. of water, and proceed as before. Wash the container and filter with a little water, and shake the combined aqueous solutions well for one minute with 15 Cc. of chloroform. Draw off the chloroform, after perfect separation, into a tared flask, and again shake out the aqueous liquid successively with three portions of 10 Cc. each of chloroform, collecting these solutions in the tared flask. Evaporate the chloroform completely; dissolve the residue in a little alcohol, evaporate the latter, redissolve the residue in alcohol, evaporate the alcohol as before, and dry the residue at 100° C. (212° F.) until the weight, after cooling, remains constant. The weight of the residue multiplied by 20 gives the percentage of colchicine in the Colchicum Seed.

Average dose.— 0.200 Gm. = 200 milligrammes (3 grains).

COLCHICINA

Colchicine

$C_{22}H_{25}NO_6 = 396.23$

An alkaloid obtained from Colchicum. It should be kept in dark amber-colored, well-stoppered vials.

Pale yellow leaflets, or a pale yellow, amorphous powder, turning darker on exposure to light, having an odor suggesting damp hay, and a very bitter taste.

Soluble in 22 parts of water, 155 parts of ether, and in 87 parts of benzene at 25° C. (77° F.); soluble in 20 parts of water at 80° C. (176° F.); very soluble in alcohol and chloroform; insoluble in petroleum benzin.

After drying over sulphuric acid, it melts if heated to 142.5° C. (288.5° F.). It leaves no residue upon incineration.

Its aqueous solution is neutral to litmus paper, lævogyrate, and of a yellow color, which is intensified by mineral acids.

With Colchicine, sulphuric acid produces a citron-yellow color, which, upon adding a drop of nitric acid, changes to greenish-blue, then to red, and finally to yellow. On adding an excess of potassium hydroxide, the color is changed to red.

Ferric chloride T.S., on being added to an aqueous solution of Colchicine, gives no color, but on heating, a brownish-red color is developed, which changes to brownish-black; if ferric chloride T.S. be added to an alcoholic solution of Colchicine, a garnet-red color is at once produced.

To 5 drops of an aqueous Colchicine solution, add 5 drops of fuming hydrochloric acid, 5 drops of ferric chloride T.S., and then heat to boiling, when a yellow solution will be formed, changing to olive-green. When cool, shake the liquid with a little chloroform, when the latter will turn ruby-red, and the aqueous solution will remain green.

Sulphuric acid containing a fragment of potassium dichromate gives a greenish-blue color, changing to orange.

Average dose.—0.0005 Gm. = 0.5 milligramme ($\frac{1}{128}$ grain).

COLLODIUM

Collodion

Pyroxylin, *forty grammes*	40 Gm.
Ether, *seven hundred and fifty cubic centimeters*	750 Cc.
Alcohol, *two hundred and fifty cubic centimeters*	250 Cc.
To make about *one thousand cubic centimeters*	1000 Cc.

To the Pyroxylin, contained in a suitable bottle, add the Ether, and allow it to stand for fifteen minutes; then add the Alcohol, and shake the bottle until the Pyroxylin is dissolved. Cork the bottle well, and set it aside until the liquid has become clear. Finally, decant the clear portion from any sediment which may have deposited, and transfer it to bottles, which should be well corked and sealed.

Keep the Collodion in a cool place, remote from lights or fire.

COLLODIUM CANTHARIDATUM

Cantharidal Collodion

Cantharides, in No. 60 powder, *sixty grammes*	60 Gm.
Flexible Collodion, *eighty-five grammes*	85 Gm.
Chloroform, *a sufficient quantity,*	
To make *one hundred grammes*	100 Gm.

Pack the Cantharides firmly in a cylindrical percolator and gradually pour Chloroform upon it until the powder is exhausted. Recover the Chloroform by distillation from a water-bath and evaporate the residue in a tared evaporating dish on a water-bath, until it weighs *fifteen grammes*. Dissolve this in the Flexible Collodion, and set it aside in a securely corked bottle, and in a cool place, to become clear by settling. *Finally*, pour off the clear portion from any sediment which may have separated, and transfer it to bottles, which should be well corked and sealed.

Keep the Cantharidal Collodion in a cool place, remote from lights or fire.

COLLODIUM FLEXILE

Flexible Collodion

Collodion, *nine hundred and twenty grammes*	920 Gm.
Canada Turpentine, *fifty grammes*	50 Gm.
Castor Oil, *thirty grammes*	30 Gm.
To make one thousand grammes . .	1000 Gm.

Weigh the ingredients, successively, into a tared bottle, and mix them thoroughly.

Keep the product in cork-stoppered bottles, in a cool place, remote from lights or fire.

COLLODIUM STYPTICUM

Styptic Collodion

Tannic Acid, *twenty grammes*	20 Gm.
Alcohol, *five cubic centimeters*	5 Cc.
Ether, *twenty-five cubic centimeters*	25 Cc.
Collodion, *a sufficient quantity,*	
To make *one hundred cubic centimeters* . .	100 Cc.

Introduce the Tannic Acid, Alcohol and Ether into a graduated bottle, agitate the mixture until the Tannic Acid is thoroughly incorporated and partially dissolved, then add enough Collodion to make up the volume to *one hundred cubic centimeters* and shake occasionally, until the Tannic Acid is completely dissolved.

Keep the product in cork-stoppered bottles, in a cool place, remote from lights or fire.

COLOCYNTHIS

Colocynth

The peeled dried fruit of *Citrullus Colocynthis* Schrader (Fam. *Cucurbitaceæ*).

Globular, from 5 to 10 Cm. in diameter, white or yellowish-white, light, spongy, separable longitudinally into three carpels, each containing near the outer surface numerous ovoid, compressed, whitish or light brown seeds; odor slight; taste intensely bitter.

The seeds should be separated and rejected.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

CONFECTIO ROSÆ

Confection of Rose

Red Rose, in No. 60 powder, *eighty grammes*	80 Gm.
Sugar, in fine powder, *six hundred and forty grammes*	640 Gm.
Clarified Honey, *one hundred and twenty grammes*	120 Gm.
Stronger Rose Water, *one hundred and sixty cubic centimeters*	160 Cc.
To make about *one thousand grammes* . .	1000 Gm.

Rub the Red Rose with the Stronger Rose Water previously heated to 65° C. (149° F.), then gradually add the Sugar and Clarified Honey, and beat the whole together until a uniform mass results.

CONFECTIO SENNÆ

Confection of Senna

Senna, in No. 60 powder, *one hundred grammes*	100 Gm.
Cassia Fistula, bruised, *one hundred and sixty grammes* . . .	160 Gm.
Tamarind, *one hundred grammes*	100 Gm.
Prune, sliced, *seventy grammes*	70 Gm.
Fig, bruised, *one hundred and twenty grammes*	120 Gm.
Sugar, in fine powder, *five hundred and fifty-five grammes* . . .	555 Gm.
Oil of Coriander, *five grammes*	5 Gm.
Water, *a sufficient quantity*,	
To make *one thousand grammes* . .	1000 Gm.

Digest the Cassia Fistula, Tamarind, Prune and Fig with *five hundred cubic centimeters* of Water in a covered vessel, by means of a water-bath, for three hours. Separate the coarser portions and rub the pulpy mass, first through a coarse hair sieve, and then through a muslin cloth. Mix the residue with *one hundred and fifty cubic centimeters* of Water, and, having digested the mixture for a short time, treat it as before, and add the product to the pulpy mass first obtained. Then, by means of a water-bath, dissolve the Sugar in the pulpy liquid, and evaporate the whole in a tared vessel, until it weighs *eight hundred and ninety-five grammes.* Lastly, add the Senna and the Oil of Coriander, and incorporate them thoroughly with the other ingredients while they are yet warm.

Average dose.— 4 Gm. (60 grains).

CONIUM

Conium

The full-grown, but unripe fruit of *Conium maculatum* Linné (Fam. *Umbelliferæ*), carefully dried and preserved, and yielding, when assayed by the process given below, not less than 0.5 percent. of coniine. After being kept for more than two years, Conium is unfit for use.

Broadly ovoid, greenish-gray, the two carpels of most of the fruits separated, each about 3 Mm. long and about 1.5 Mm. in diameter, ovoid, somewhat curved, the inner, flattened side marked by a deep longitudinal groove, the outer, convex side with five pale yellow, somewhat crenate ribs, the intervening surfaces wrinkled but otherwise smooth; pericarp without oil-tubes; odor slight, but when triturated with a solution of potassium hydroxide, strong, disagreeable, and mouse-like; taste characteristic, disagreeable, afterwards somewhat acrid.

Assay of Conium

Conium, in No. 60 powder, *ten grammes* . . . . 10 Gm.
Ether,
Alcohol,
Ammonia Water,
Normal Sulphuric Acid V.S.,
Sodium Carbonate T.S.,
Distilled Water,
Hydrochloric Acid Solution (5 percent. HCl), each, *a sufficient quantity.*

Place the Conium in a 200 Cc. Erlenmeyer flask, add 100 Cc. of a mixture of ether 98 parts, alcohol 8 parts, and ammonia water 3 parts (by volume), insert the stopper securely, and shake the flask at intervals during four hours. After the powder has settled, decant 50 Cc. of the clear liquid into a beaker (representing 5 Gm. of Conium), and add sufficient normal sulphuric acid V.S. to produce a distinctly acid reaction. Evaporate the ether at a gentle heat by the aid of a water-bath; then add 15 Cc. of alcohol, and set the beaker aside in a cool place for two hours to allow the ammonium sulphate to deposit. Filter the liquid; wash the residue and filter with a little alcohol, and add the washings to the filtrate; neutralize any excessive amount of acid with sodium carbonate T.S., being careful to retain a slight acidity. Concentrate the liquid to 3 Cc. by the aid of a gentle heat on a water-bath, add 3 Cc. of distilled water and 2 drops of normal sulphuric acid V.S. Add 15 Cc. of ether to remove traces of fatty matter, pour off the ether-solution and repeat the washing with 15 Cc. of ether. Then transfer the acid liquid to a separator, introduce a small piece of red litmus paper, and add sufficient sodium carbonate T.S. to render the liquid slightly alkaline; then shake out with successive portions of 15, 15, and 10 Cc. of ether. To the combined ether-solutions, in a tared beaker, add, drop by drop, sufficient hydrochloric acid solution (5 percent.) to insure an excess of acid, and then evaporate the ether by a gentle heat on a water-bath. Remove the excess of hydrochloric acid by adding to the residue 3 Cc. of alcohol and heating gently to evaporate the liquid, repeat this operation once, and dry the residue at a temperature not exceeding 60° C. (140° F.) until the weight, after cooling in a desiccator, remains constant. The weight of the residue multiplied by 0.777, and this product by 20, gives the percentage of coniine contained in the Conium.

Average dose.— 0.200 Gm. = 200 milligrammes (3 grains).

CONVALLARIA

Convallaria

The dried rhizome and roots of *Convallaria majalis* Linné (Fam. *Liliaceæ*).

Rhizome of horizontal growth, somewhat branched, length variable, 1 to 3 Mm. thick, cylindrical, whitish or pale-brown, marked with few circular stem-scars and at each joint with a circle of root-scars or thin, tortuous and branched roots; fracture fibrous but weak; internally whitish; odor distinct; taste sweetish, bitter, and slightly acrid.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

COPAIBA

Copaiba

An oleoresin derived from one or more South American species of *Copaiba* (Fam. *Leguminosæ*).

A pale yellow to brownish-yellow, more or less transparent and viscid liquid, sometimes fluorescent; having a peculiar, aromatic odor and a persistent, bitter and acrid taste.

Specific gravity: 0.950 to 0.995 at 25° C. (77° F.).

Insoluble in water; soluble, or showing at most a slight opalescence, in absolute alcohol, carbon disulphide, petroleum benzin, and in fixed and volatile oils; completely soluble in chloroform and ether.

When heated on a water-bath, it should evolve no odor of turpentine, and after forty-eight hours should leave a resinous mass weighing not less than 50 percent. of its original weight.

One Gm. of Copaiba, when dissolved in 50 Cc. of alcohol, should require not less than 2.3 Cc., and not more than 3.2 Cc. of half-normal alcoholic potassium hydroxide V.S. for neutralization, using 1 Cc. of phenolphthalein T.S. as indicator (presence of a normal proportion of *acid resin*).

When 1 drop of nitric acid (sp. gr. 1.40) and 3 Cc. of glacial acetic acid are mixed in a test-tube, and 4 drops of Copaiba are carefully poured on top of the liquid, no reddish zone should appear; nor should the fluid assume a red or purple color after being shaken (absence of *gurjun balsam*).

If 5 Cc. of Copaiba be shaken with 15 Cc. of alcohol, and heated to boiling for one minute, no drops of oil should separate after cooling and standing for an hour (absence of *paraffin oils*).

If 20 drops of Copaiba be boiled with 1 Cc. of an alcoholic potassium hydroxide solution (1 in 10) for two minutes and cooled, and then twice its volume of ether be added to the liquid, no gelatinization should occur (absence of *fixed oils*).

If 1 Gm. of Copaiba be shaken with 10 Cc. of ammonia water in a stoppered vial, and allowed to stand for twenty-four hours, the liquid will become turbid, but it should not gelatinize, nor should a firm mass be formed (limit of *resin*).

Average dose.— 1 Cc. (15 minims).

CORIANDRUM

Coriander

The dried ripe fruit of *Coriandrum sativum* Linné (Fam. *Umbelliferæ*).

Nearly globular, brownish-yellow, smooth, 4 to 5 Mm. in diameter, crowned with the calyx teeth and a short stylopodium ; mericarps usually united, each with five prominent, straight primary ribs and four indistinct secondary ribs, the inner surface deeply concave and with two oil-tubes ; odor and taste agreeably aromatic.

***Average dose.*— 0.500 Gm. = 500 milligrammes (7½ grains).**

CREOSOTUM

Creosote

A mixture of phenols and phenol derivatives, chiefly guaiacol and creosol, obtained during the distillation of wood-tar, preferably of that derived from the beech, *Fagus silvatica* Linné or *Fagus ferruginea* Aiton (Fam. *Fagaceæ*).

An almost colorless, yellowish (not pinkish), highly refractive, oily liquid, having a penetrating, smoky odor, and a burning, caustic taste ; it should not become brown in color on exposure to light.

Specific gravity not below 1.078 at 25° C. (77° F.).

Its solution in about 140 parts of water at 25° C. (77° F.) is not perfectly clear. With 120 parts of hot water it forms a clear liquid, which, on cooling, becomes turbid from the separation of minute oily drops (distinction from, and absence of, both *phenol* and so-called "*coal-tar creosote*"). The filtrate from these separated oily globules yields a reddish-brown precipitate with bromine T.S. (distinction from *phenol* and so-called "*coal-tar creosote*," both of which yield white precipitates). Soluble in all proportions in absolute alcohol, ether, chloroform, carbon disulphide, acetic acid, and fixed and volatile oils.

When distilled, most of it comes over between 200° and 220° C. (392° and 428° F.). When cooled to —20° C. (—4° F.), it becomes gelatinous, but does not solidify (difference from *phenol*). It is inflammable, burning with a luminous, smoky flame.

Creosote is neutral or only faintly acid to litmus paper.

On stirring together equal volumes of Creosote and collodion in a dry test-tube, no permanent coagulum should form (difference from *phenol* and so-called "*coal-tar creosote*," and limit of the former).

If 1 volume of Creosote be mixed with 1 volume of 95 percent. glycerin, a clear mixture will result, from which a creosotic layer, equal to or greater in volume than the Creosote employed, will separate on the addition of one-fourth volume of water (difference from, and limit of, *phenols*).

On adding to 10 Cc. of a saturated aqueous solution of Creosote 1 drop of ferric chloride T.S., the liquid develops a clear violet-blue color, which is very transient; it then clouds almost instantly, the color passing rapidly from a grayish-green into a muddy brown, with finally the formation of a brown precipitate (difference from *phenol* and so-called "*coal-tar creosote*," and limit of the former).

If 1 Cc. of Creosote be mixed with 10 Cc. of a solution of potassium hydroxide in absolute alcohol (1 in 5), a solid crystalline mass will form (difference from *phenol* and so-called "*coal-tar creosote*," and limit of the former).

Two Cc. of Creosote should require not less than 10 Cc., nor more than 18 Cc.

of normal sodium hydroxide V.S. to produce a clear, pale yellow liquid, which remains unclouded on diluting with 50 Cc. of water (absence of *neutral oils*).

If 1 Cc. of Creosote be cautiously and gently shaken with 2 Cc. of petroleum benzin and 2 Cc. of freshly prepared barium hydroxide T.S. until a uniform mixture is produced, upon complete separation three distinct layers are visible, the middle one of which contains the Creosote, unaltered in appearance; while the petroleum benzin should not be blue or muddy, and the aqueous layer should not have acquired a red tint (absence of *cœrulignol* and some *other high-boiling constituents of wood-tar*).

Average dose.— 0.2 Cc. (3 minims).

CRESOL

Cresol

$C_7H_7.OH = 107.25$

A mixture [$C_6H_4(CH_3)OH$] of the three isomeric Cresols obtained from coal-tar, freed from phenol, hydrocarbons, and water. It should be preserved in amber-colored bottles, protected from light.

A colorless or straw-colored refractive liquid, having a phenol-like odor, and turning yellowish-brown on prolonged exposure to light.

Specific gravity: from 1.036 to 1.038 at 25° C. (77° F.).

Cresol is soluble in 60 parts of water at 25° C. (77° F.); miscible in all proportions with petroleum benzin, benzene, alcohol, ether, and glycerin; miscible with alkali hydroxide solutions.

When distilled, 90 percent. of the Cresol should boil between 195° and 205° C. (383° and 401° F.).

If 1 Cc. of Cresol be mixed with 1 Cc. of an aqueous solution of sodium hydroxide (1 in 10), it should dissolve with no appreciable liquid residue (absence of, or limit of, *hydrocarbons*).

Average dose.— 0.05 Cc. (1 minim).

CRETA PRÆPARATA

Prepared Chalk

$CaCO_3 = 99.35$

Native Calcium Carbonate, freed from most of its impurities by elutriation.

A white to grayish-white, very fine amorphous powder, often moulded into conical drops; odorless and tasteless; permanent in the air.

Almost insoluble in water; insoluble in alcohol; soluble in diluted acetic, hydrochloric, or nitric acids, with copious effervescence, leaving not more than a trifling residue.

When heated to full redness, Prepared Chalk gradually loses carbon dioxide, and is converted into calcium oxide.

Average dose.— 1 Gm. (15 grains).

CUBEBA

Cubeb

The dried unripe, but fully grown, fruit of *Piper Cubeba* Linné filius (Fam. *Piperaceæ*).

From 10 to 13 Mm. long, the upper portion globoidal, 4 to 5 Mm. in diameter, contracted at the base into a slender stem-like portion, about 6 or 8 Mm. long; pericarp reticulately wrinkled, blackish-gray, about 0.3 Mm. thick; internally light brown, smooth, oily, one-seeded; brittle; of a strongly aromatic, somewhat camphoraceous odor and taste.

The powder contains few or no starch grains, and on treatment with sulphuric acid the fragments become wine-colored.

Average dose.— 1 Gm. (15 grains).

CUPRI SULPHAS

Copper Sulphate

$CuSO_4 + 5H_2O = 247.85$

It should contain not less than 99.5 percent. of pure Copper Sulphate [$SO_2.O_2Cu + 5H_2O$].

Large, transparent, deep blue, triclinic crystals; odorless; of a nauseous, metallic taste; slowly efflorescent in dry air.

Soluble in about 2.2 parts of water, 400 parts of alcohol, and 3.5 parts of glycerin at 25° C. (77° F.), and in 0.5 part of boiling water.

When heated to 30° C. (86° F.), the salt loses 2 of its 5 molecules of water (14.43 percent.), and is converted into a pale blue, amorphous powder. Two more molecules of water are lost at 100° C. (212° F.), while the fifth is retained until 200° C. (392° F.) is reached, when a white, anhydrous powder remains (63.9 percent. of the original weight). At a still higher temperature, sulphur dioxide and oxygen are given off, and a residue of black cupric oxide is left.

The aqueous solution (1 in 20) has a blue color, and shows an acid reaction with blue litmus paper.

If a drop of the solution be placed upon a bright piece of iron, a red film of metallic copper will be produced.

With potassium ferrocyanide T.S. the solution yields a deep reddish-brown precipitate.

Barium chloride T.S. produces in the solution a white precipitate, insoluble in hydrochloric acid.

If ammonia water be added to the solution, drop by drop, a pale blue precipitate of cupric hydroxide is formed, which redissolves in an excess of ammonia water, forming a deep azure-blue solution.

If hydrogen sulphide gas be passed through 10 Cc. of the aqueous solution of the salt (1 in 20), to which 1 Cc. of diluted hydrochloric acid has been added, until all of the copper is precipitated as sulphide, one-half of the colorless filtrate should not be colored or rendered turbid upon the addition of ammonia water, nor should the remaining portion of the filtrate yield, upon evaporation and ignition, a weighable residue (limit of *iron*, *aluminum*, etc.).

If the aqueous solution of the salt (1 in 20) be heated to boiling with an ex-
hydroxide T.S., until all of the copper has been converted into
de, it will yield a colorless filtrate, which, after acidulation with

acetic acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Average dose.— Astringent, 0.010 Gm. = 10 milligrammes (⅙ grain).
Emetic, 0.250 Gm. = 250 milligrammes (4 grains).

CUSSO

Kousso

The dried panicles of the pistillate flowers of *Hagenia abyssinica* (Bruce) Gmelin (Fam. *Rosaceæ*).

In rolls or compressed bundles from 25 to 40 Cm. long, reddish-brown, each branch arising from the axil of a sheathing bract, and each flower furnished at its base with two rounded bracts; calyx-tube top-shaped, pubescent, and bearing a circle, resembling an outer calyx, of five rigid, spreading, obovate, purple-veined bracts, which are larger than the five usually shrivelled and incurved oval calyx-lobes; the five caducous petals usually absent in the drug; carpels two; styles exserted and stigmas broad and hairy; odor slight; taste bitter.

The large stems should be rejected.

Average dose.— 16 Gm. (240 grains).

CYPRIPEDIUM

Cypripedium

The dried rhizome and roots of *Cypripedium hirsutum* Miller (*Cypripedium pubescens* Willdenow) or of *Cypripedium parviflorum* Salisbury (Fam. *Orchidaceæ*).

Rhizome of horizontal growth, curved, 3 to 10 Cm. long, 2 to 6 Mm. thick, orange-brown to dark brown, the upper side beset with numerous circular, cup-shaped scars, closely covered below with simple wiry roots varying from 3 to 15 Cm. in length; fracture of rhizome short, white, that of roots somewhat fibrous; odor distinct, heavy, valerian-like; taste sweetish, bitter, and somewhat pungent.

Average dose.—1 Gm. (15 grains).

DECOCTA

Decoctions

An ordinary Decoction, the strength of which is not directed by the physician, shall be prepared by the following formula:

Take of

The Substance, coarsely comminuted, *fifty grammes*	50 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Introduce the Substance into a suitable vessel provided with a cover, pour upon it *one thousand cubic centimeters* of cold Water, cover it well, and boil for fifteen minutes. Then allow it to cool to about 40° C. (104° F.), express, strain the expressed liquid, and pass enough cold Water through the strainer to make the product measure *one thousand cubic centimeters.*

Caution.—The strength of Decoctions of energetic or powerful substances should be specially prescribed by the physician.

DIGITALIS

Digitalis

The dried leaves of *Digitalis purpurea* Linné (Fam. *Scrophulariaceæ*), collected from plants of the second year's growth, at the commencement of flowering.

Usually in more or less crumpled and broken fragments; ovate to oval, from 10 to 30 Cm. long, 5 to 15 Cm. broad, abruptly contracted into a winged petiole from 5 to 10 Cm. long; thin, dull and rather pale green or grayish underneath; upper surface wrinkled, sparsely hairy; lower surface densely and finely hairy, the venation conspicuously reticulated; margin crenate or erose-dentate; the midrib and principal veins broad and flat, usually purplish, the lower veins continued into the wings of the petiole; odor slight, characteristic; taste strongly bitter.

In the powder, stone-cells, star-shaped hairs, and calcium oxalate crystals are absent.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

ELASTICA

Rubber

The prepared milk-juice of several species of *Hevea* Aublet (Fam. *Euphorbiaceæ*), known in commerce as Para Rubber.

In flask-shaped or roundish masses, or in pieces of the same having sharply incised surfaces and exhibiting a laminated structure; floating on water; externally brownish to brownish-black; internally of a lighter tint, mottled; odor creosote-like; nearly tasteless.

Pure Para Rubber is insoluble in water, dilute acids, or dilute solutions of the alkalies; soluble in chloroform, carbon disulphide, oil of turpentine, petroleum benzin, and benzene; when heated to about 125° C. (257° F.) it melts, remaining soft and adhesive after cooling.

ELATERINUM

Elaterin

$C_{20}H_{28}O_5 = 345.60$

principle obtained from elaterium, a substance deposited of the fruit of *Ecballium Elaterium* (Linné) A. Richard *ilaceæ*).

Minute, white, hexagonal scales or prismatic crystals; without odor, and having a slightly acrid, bitter taste; permanent in the air, and containing no water of crystallization.

Insoluble in water; soluble in 262 parts of alcohol, 318 parts of ether, 22 parts of chloroform, 272 parts of benzene, and 200 parts of amyl alcohol at 25° C. (77° F.); soluble in 75 parts of alcohol at 60° C. (140° F.).

When heated to 190° C. (374° F.) it turns yellow, and at 216° C. (420.8° F.) it melts, forming a yellowish-brown liquid. On ignition, it is consumed without leaving any residue.

Its solutions are neutral to litmus paper.

Sulphuric acid colors it yellow, the color changing gradually to scarlet.

Sulphuric acid containing a trace of ammonium vanadate produces a blue color, changing to green and then to brown.

Sulphuric acid containing a drop of formaldehyde gives a brown color.

Sulphuric acid containing a trace of potassium dichromate produces an olive green color, gradually turning darker.

If a crystal of Elaterin be added to a little hydrochloric acid, and this evaporated to dryness, the residue washed with hot water, and afterwards treated with sulphuric acid, a brownish-red (amaranth) color will be produced.

An alcoholic solution of Elaterin should not be precipitated by tannic acid T.S., mercuric chloride T.S., or platinic chloride T.S. (absence of, and difference from *alkaloids*).

Average dose.—0.005 Gm. = 5 milligrammes ($\frac{1}{10}$ grain).

ELIXIR ADJUVANS

Adjuvant Elixir

Fluidextract of Glycyrrhiza, *one hundred and twenty cubic centimeters*	120 Cc.
Aromatic Elixir, *eight hundred and eighty cubic centimeters*	880 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix, and filter if necessary.

ELIXIR AROMATICUM

Aromatic Elixir

Compound Spirit of Orange, *twelve cubic centimeters*	12 Cc.
Syrup, *three hundred and seventy-five cubic centimeters*	375 Cc.
Purified Talc, *thirty grammes*	30 Gm.
Alcohol, **Distilled Water,** each, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

To the Compound Spirit of Orange, add enough Alcohol to make *two hundred and fifty cubic centimeters.* To this solution, add the Syrup in several portions, agitating after each addition, and afterwards add, in the same manner, *three hundred and seventy-five cubic centimeters* of Distilled Water. Mix the Purified Talc intimately with the liquid, and then filter through a wetted filter, returning the first portions of the filtrate until a transparent liquid is obtained. Lastly, wash the filter with a mixture of *one volume* of Alcohol and *three volumes* of Distilled Water, until the product measures *one thousand cubic centimeters.*

ELIXIR FERRI, QUININÆ ET STRYCHNINÆ PHOSPHATUM

Elixir of the Phosphates of Iron, Quinine and Strychnine

Soluble Ferric Phosphate, *seventeen and one-half grammes*	17.500 Gm.
Quinine, *eight and seventy-five hundredths grammes*	8.750 Gm.
Strychnine, *two hundred and seventy-five milligrammes*	0.275 Gm.
Phosphoric Acid, *two cubic centimeters*	2.000 Cc.
Ammonium Carbonate, in translucent pieces, *nine grammes*	9.000 Gm.
Alcohol, *sixty cubic centimeters*	60.000 Cc.
Acetic Acid, *twenty-eight and sixty-five hundredths grammes*	28.650 Gm.
Ammonia Water,	
Distilled Water,	
Aromatic Elixir, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Dissolve the Quinine and Strychnine in the Alcohol, then add the Phosphoric Acid and *three hundred and fifty cubic centimeters* of Aromatic Elixir. Add the Acetic Acid to the Ammonium Carbonate, contained in a suitable vessel, and when solution is complete, neutralize with Ammonia Water and add enough Distilled Water to make the product measure *fifty cubic centimeters.* Mix the solution of Ammonium Acetate with the solution of the alkaloids, and add enough Aromatic Elixir to make the liquid measure *eight hundred and eighty cubic centimeters.* Dissolve the Ferric Phosphate in *thirty cubic centimeters* of Distilled Water, by the aid of a gentle heat, and if the solution be acid to litmus paper, neutralize exactly with Ammonia Water, and add enough Aromatic Elixir to make the product measure *one hundred and twenty cubic centimeters.* Finally, mix the two solutions and filter if necessary.

Average dose.— 4 Cc. (1 fluidrachm).

EMPLASTRUM ADHÆSIVUM

Adhesive Plaster

Rubber, cut in small pieces, *twenty grammes*	20 Gm.
Petrolatum, *twenty grammes*	20 Gm.
Lead Plaster, *nine hundred and sixty grammes*	960 Gm.
To make *one thousand grammes*	1000 Gm.

Melt the Rubber at a temperature not exceeding 150° C. (302° F.); add the Petrolatum, and continue the heat until the Rubber is dissolved. Add the Lead Plaster to the hot mixture; continue the heat until it becomes liquid, then strain, allow it to cool, and stir until it stiffens.

EMPLASTRUM BELLADONNÆ

Belladonna Plaster

Belladonna Plaster should contain not less than 0.38 percent. nor more than 0.42 percent. of mydriatic alkaloids.

Extract of Belladonna Leaves, *three hundred grammes* . .	300 Gm.
Adhesive Plaster, *seven hundred grammes*	700 Gm.
To make about *one thousand grammes* . .	1000 Gm.

Melt the Adhesive Plaster on a water-bath, add to it the Extract of Belladonna Leaves, softened by the heat of a water-bath, and continue the heat, stirring constantly until the mixture is perfectly homogeneous; then allow it to cool.

Spread Belladonna Plasters made with a rubber base should yield, when assayed by the process given below, not less than 0.38 percent. nor more than 0.42 percent. of mydriatic alkaloids.

Assay of Belladonna Plaster (Rubber Base)

Belladonna Plaster, spread upon cloth, *ten grammes*	10 Gm.
Chloroform,	
Ammonia Water,	
Alcohol,	
Distilled Water,	
Normal Sulphuric Acid V.S.,	
Tenth-normal Sulphuric Acid V.S.,	
Fiftieth-normal Potassium Hydroxide V.S.,	
Cochineal T.S., each, *a sufficient quantity.*	

Into a suitable beaker containing 50 Cc. of chloroform and 3 Cc. of ammonia water, introduce the Belladonna Plaster cut into strips. Stir until the Plaster is entirely removed from the cloth; then pour off the chloroform into another beaker, wash the cloth with 25 Cc. of chloroform and 1 Cc. of ammonia water carefully, and add the washings to the chloroformic solution first obtained. If necessary, repeat the washing with 25 Cc. of chloroform, and add this also to the chloroformic solution. Then dry the cloth at a low temperature; cool and weigh it, and subtract its weight from the original weight of the Plaster. To the chloroformic solution, add four-fifths of its volume of alcohol, stir gently, and allow the liquid to stand until all of the rubber has separated in a compact mass. Then pour off the supernatant liquid into a separator of 250 Cc. capacity, and, having prepared a solution of sulphuric acid by diluting 40 Cc. of normal sulphuric acid V.S. with 60 Cc. of distilled water, add 20 Cc. of the solution to the separator, and agitate for two minutes, rotating gently. Draw off the chloroformic solution into another separator, shake this with 10 Cc. of the sulphuric acid solution, and add the acid solution to that in the first separator. Repeat until the acid washings cease to give a reaction with mercuric potassium iodide T.S.; combine the acid liquids, and, having rendered this solution alkaline with ammonia water, shake out the alkaloids with three successive portions of 25, 15, and 10 Cc. of chloroform. Collect these in a flask, distil off all of the chloroform with the aid of a water-bath. To the alkaloidal residue add a slight excess of tenth-normal sulphuric acid V.S., noting the quantity used, and then add 10 drops of chloroform and, after rotating, evaporate the latter by means of a water-bath. Then add 5 drops of cochineal T.S., and, rotating, titrate the excess of acid with fiftieth-normal potassium hydroxide V.S. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from the number of cubic centimeters of tenth-normal sulphuric acid V.S. first added, and divide the difference by the number of grammes of Belladonna Plaster separated from the cloth; multiply the quotient by 0.0287, and this product by 100, which will give the percentage of mydriatic alkaloids in the Belladonna Plaster.

EMPLASTRUM CAPSICI

Capsicum Plaster

Oleoresin of Capsicum, *twenty-five hundredths of a gramme* .	0.25 Gm.
Adhesive Plaster, spread on fabric, *a sufficient quantity.*	

Apply the Oleoresin of Capsicum to the surface of the Adhesive Plaster by means of a brush, so as to form a thin coating over an area fifteen centimeters square, leaving a margin around the sides.

EMPLASTRUM HYDRARGYRI

Mercurial Plaster

Mercury, *thirty grammes*	30 Gm.
Oleate of Mercury, *one gramme*	1 Gm.
Hydrous Wool-Fat, *ten grammes*	10 Gm.
Lead Plaster, *fifty-nine grammes*	59 Gm.
To make *one hundred grammes* . .	100 Gm.

Triturate the Mercury with the Oleate of Mercury until the former is thoroughly divided, then add the Hydrous Wool-Fat, and continue the trituration until globules of Mercury are no longer visible. Add the mixture to the Lead Plaster, which has previously been melted in a tared dish, and incorporate thoroughly, adding, if necessary, sufficient Lead Plaster to make the product weigh *one hundred grammes.*

EMPLASTRUM OPII

Opium Plaster

Extract of Opium, *six grammes*	6 Gm.
Water, *eight cubic centimeters*	8 Cc.
Adhesive Plaster, *ninety grammes*	90 Gm.
To make *one hundred grammes* . .	100 Gm.

Rub the Extract of Opium with the Water until it is uniformly soft; add it to the Adhesive Plaster, which has been previously melted in a tared dish on a water-bath, and continue the heat with constant stirring until the product weighs *one hundred grammes.*

EMPLASTRUM PLUMBI

Lead Plaster

Soap, dried, and in coarse powder, *one hundred grammes*	100 Gm.
Lead Acetate, *sixty grammes*	60 Gm.
Water, *a sufficient quantity.*	

Dissolve the Soap in *three hundred and fifty cubic centimeters* of hot Water and strain the solution. Dissolve the Lead Acetate in *two hundred and fifty cubic centimeters* of hot Water, and at once filter the solution into the warm Soap solution, stirring constantly.

When the precipitate has subsided, decant the liquid, and wash the precipitate thoroughly with hot Water. Transfer the mass to a warm slab, kneading it thoroughly to free it from water. Finally, roll the plaster into cylindrical forms and wrap them in paraffined paper.

EMPLASTRUM SAPONIS

Soap Plaster

Soap, dried, and in coarse powder, *ten grammes*	10 Gm.
Lead Plaster, *ninety grammes*	90 Gm.
Water, *a sufficient quantity,*	
To make about *one hundred grammes*	100 Gm.

Rub the Soap with enough Water to reduce it to a semi-liquid state; then mix it with the Lead Plaster previously melted, incorporate thoroughly by stirring, and evaporate to the proper consistence.

EMULSUM AMYGDALÆ

Emulsion of Almond

Sweet Almond, *sixty grammes*	60 Gm.
Acacia, in fine powder, *ten grammes*	10 Gm.
Sugar, *thirty grammes*	30 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Having blanched the Almond, add the Acacia and Sugar, and beat them in a mortar, until they are thoroughly mixed. Then rub the mass with *nine hundred cubic centimeters* of Water, at first very gradually added, until a uniform mixture results. Strain this into a graduated vessel, and wash the mortar and strainer with enough Water to make the product measure *one thousand cubic centimeters.* Mix the whole thoroughly. This Emulsion should be freshly prepared when required.

Average dose.—120 Cc. (4 fluidounces).

EMULSUM ASAFŒTIDÆ

Emulsion of Asafetida

Asafetida, in selected tears, *forty grammes*	40 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Rub the Asafetida in a mortar, with *nine hundred cubic centimeters* of Water, at first very gradually added, until a uniform emulsion results. Then strain the mixture into a graduated vessel, and rinse the mortar and strainer with enough Water to make the product measure *one thousand cubic centimeters.* Mix the whole thoroughly.

Average dose.—16 Cc. (4 fluidrachms).

EMULSUM CHLOROFORMI

Emulsion of Chloroform

Chloroform, *forty cubic centimeters*	40 Cc.
Expressed Oil of Almond, *sixty cubic centimeters*	60 Cc.
Tragacanth, in very fine powder, *ten grammes*	10 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Introduce the Tragacanth into a perfectly dry bottle of sufficient capacity, add the Chloroform, and shake the bottle thoroughly, so that every part of the surface may become wetted. Then add about *two hundred and fifty cubic centimeters* of Water, and incorporate it by vigorous shaking. Next add the Expressed Oil of Almond, in several portions, shaking after each addition, and when the Oil has been thoroughly emulsified, add enough Water, in divided portions, shaking after each addition, to make the product measure *one thousand cubic centimeters.*

Average dose.—8 Cc. (2 fluidrachms).

EMULSUM OLEI MORRHUÆ

Emulsion of Cod Liver Oil

Cod Liver Oil, *five hundred cubic centimeters*	500 Cc.
Acacia, in fine powder, *one hundred and twenty-five grammes*	125 Gm.
Syrup, *one hundred cubic centimeters*	100 Cc.
Oil of Gaultheria, *four cubic centimeters*	4 Cc.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Rub the Acacia with the Cod Liver Oil in a dry mortar until uniformly mixed, then add at once *two hundred and fifty cubic centimeters* of Water and triturate lightly and rapidly until a thick homogeneous emulsion is produced; to this add the Oil of Gaultheria and the Syrup, with enough Water to make the product measure *one thousand cubic centimeters*, and mix thoroughly.

NOTE.—The Oil of Gaultheria may be replaced, if desired, by a suitable quantity of Oil of Bitter Almond or other suitable flavoring.

Average dose.—8 Cc. (2 fluidrachms).

EMULSUM OLEI MORRHUÆ CUM HYPOPHOSPHITIBUS

Emulsion of Cod Liver Oil with Hypophosphites

Cod Liver Oil, *five hundred cubic centimeters*	500 Cc.
Acacia, in fine powder, *one hundred and twenty-five grammes*	125 Gm.
Calcium Hypophosphite, *ten grammes*	10 Gm.
Potassium Hypophosphite, *five grammes*	5 Gm.
Sodium Hypophosphite, *five grammes*	5 Gm.
Syrup, *one hundred cubic centimeters*	100 Cc.
Oil of Gaultheria, *four cubic centimeters*	4 Cc.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Rub the Acacia with the Cod Liver Oil in a dry mortar until uniformly mixed, then add at once *two hundred and fifty cubic centimeters* of Water and triturate lightly and rapidly until a thick, homogeneous emulsion is produced, add the Oil of Gaultheria and incorporate thoroughly; dissolve the Hypophosphites in *one hundred cubic centimeters* of Water, mix the solution with the Syrup, and add the liquid gradually to the emulsion with continued trituration. Lastly, add enough Water to make the product measure *one thousand cubic centimeters*, and mix thoroughly.

Note. The Oil of Gaultheria may be replaced, if desired, by a suitable quantity of Oil of Bitter Almond or other suitable flavoring.

Average dose.—8 Cc. (2 fluidrachms).

EMULSUM OLEI TEREBINTHINÆ

Emulsion of Oil of Turpentine

Rectified Oil of Turpentine, *fifteen cubic centimeters*	15 Cc.
Expressed Oil of Almond, *five cubic centimeters*	5 Cc.
Syrup, *twenty-five cubic centimeters*	25 Cc.
Acacia, in fine powder, *fifteen grammes*	15 Gm.
Water, *a sufficient quantity,*	
To make *one hundred cubic centimeters*	100 Cc.

Introduce the Acacia into a perfectly dry bottle of sufficient capacity, add the Rectified Oil of Turpentine and the Expressed Oil of Almond and shake the bottle thoroughly. Then add about *thirty cubic centimeters* of Water and incorporate it by vigorous shaking. When the Oil has been completely emulsified, add first the Syrup, in several portions, shaking after each addition, and then enough Water, in divided portions, shaking after each addition, to make the product measure *one hundred cubic centimeters.*

Average dose.—4 Cc. (1 fluidrachm).

ERGOTA

Ergot

The sclerotium of *Claviceps purpurea* (Fries) Tulasne (Fam. *Hypocreaceæ*), replacing the grain of rye, *Secale cereale* Linné (Fam. *Gramineæ*). Ergot should be moderately dried, and not exposed to a damp atmosphere. After being kept more than one year, it is unfit for use.

Subcylindrical, obscurely three-angled, tapering toward both ends but obtuse, somewhat curved, 1.5 to 3 Cm. long and about 3 Mm. thick; externally purplish black, longitudinally furrowed on each side, more conspicuously on the concave side; fracture short, pinkish or reddish-white; odor peculiar, heavy, increased by trituration with potassium hydroxide T.S.; taste disagreeable.

Average dose.—2 Gm. (30 grains).

ERIODICTYON

Eriodictyon

The dried leaves of *Eriodictyon californicum* (Hooker and Arnott) Greene (Fam. *Hydrophyllaceæ*).

Usually occurring in fragments; entire leaf oblong-lanceolate, 5 to 15 Cm. long and 1 to 3 Cm. broad, acute at the apex, narrowed below into a short, broad petiole, the margin more or less incurved, entire or irregularly serrate, or crenate-dentate; upper surface yellowish-green, smooth, covered with a brownish resin; lower surface whitish or yellowish-white, conspicuously reticulated and densely tomentose; brittle, but flexible in a damp and warm atmosphere; odor somewhat aromatic; taste balsamic and sweetish.

Average dose.— 1 Gm. (15 grains).

EUCALYPTOL

Eucalyptol

$C_{10}H_{18}O = 152.98$

An organic oxide (cineol), obtained from the volatile oil of *Eucalyptus Globulus* Labillardière (Fam. *Myrtaceæ*), and from other sources. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless liquid, having a characteristic, aromatic, and distinctly camphoraceous odor, and a pungent, spicy, and cooling taste.

Specific gravity: from 0.921 to 0.923 at 25° C. (77° F.).

Soluble in all proportions in alcohol.

Boiling point: 176° to 177° C. (348.8° to 350.6° F.).

Eucalyptol is optically inactive (distinction from the *oil of eucalyptus* and *many other volatile oils*).

When exposed to a temperature somewhat below 0° C. (32° F.) it solidifies to a mass of colorless, needle-shaped crystals, which liquefy at —1° C. (30.2° F.).

If 1 Cc. of Eucalyptol be placed in a freezing mixture, and an equal volume of phosphoric acid be gradually added, a solid white crystalline mass of cineol-phosphoric acid should result, and if warm water be then added the cineol will separate.

If 5 Cc. of Eucalyptol be shaken with 5 Cc. of sodium hydroxide T.S., it should not diminish in volume.

Its alcoholic solution should be neutral to litmus paper, and if to 5 Cc. of this solution a drop of ferric chloride T.S. be added, there should not be produced a brownish or violet color (absence of *phenols*).

Average dose.— 0.3 Cc. (5 minims).

EUCALYPTUS

Eucalyptus

The dried leaves of *Eucalyptus Globulus* Labillardière (Fam. *Myrtaceæ*), collected from the older parts of the tree.

Petiole twisted, 2 to 3 Cm. long; blade lanceolately scythe-shaped, from 15 to 30 Cm. long, 2 to 4 Cm. broad, tapering above, rounded or very abruptly contracted at the oblique base, coriaceous, pale green, pellucid-punctate; venation inconspicuous, anastomosing near the entire margin; odor aromatic and somewhat camphoraceous; taste aromatic, bitter, and cooling.

Average dose.— 2 Gm. (30 grains).

EUGENOL

Eugenol

$C_{10}H_{12}O_2 = 162.86$

An unsaturated, aromatic phenol $[C_6H_3(OH)(OCH_3).C_3H_5\ 4:3:1]$, obtained from Oil of Cloves and other sources. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless, or pale yellow, thin liquid, having a strongly aromatic odor of cloves, and a pungent and spicy taste. Exposure to air causes it to become darker and thicker.

Specific gravity: 1.066 to 1.068 at 25° C. (77° F.).

Eugenol is miscible with alcohol in all proportions, and should be soluble in 2 parts of 70 percent. alcohol.

Boiling point: 251° to 253° C. (483.8° to 487.4° F.).

It is optically inactive.

When 1 part of Eugenol is dissolved in 12 parts of sodium hydroxide T.S. and 18 parts of water are added, a clear solution should result, which becomes turbid when exposed to the air.

A mixture of 1 part of Eugenol and 20 parts of hot water should redden litmus paper very slightly. Five Cc. of the cold, clear filtrate from this mixture, upon the addition of 1 drop of ferric chloride T.S., should show a transient grayish-green color, but not a blue or violet color (absence of *phenol*).

Average dose.—0.2 Cc. (3 minims).

EUONYMUS

Euonymus

The dried bark of the root of *Euonymus atropurpureus* Jacquin (Fam. *Celastraceæ*).

In quilled or curved pieces, 3 to 7 Cm. long and 0.5 to 5 Mm. thick: outer surface ashy or pale brownish-gray, with small, dark, scaly patches of soft cork; inner surface whitish or light brown, smooth; fracture short, whitish, with projecting, silky, modified bast fibres; odor distinct; taste sweetish, bitter and somewhat acrid.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

EUPATORIUM

Eupatorium

The dried leaves and flowering tops of *Eupatorium perfoliatum* Linné (Fam. *Compositæ*).

Usually occurring in fragments; leaves opposite, the pair united at the base, from 5 to 20 Cm. long and 1.5 to 5 Cm. broad, tapering regularly from near the base to an acute apex, crenate-serrate, rugosely veined, rough and bright green above, yellowish-gray-green, tomentose and resinous-dotted beneath; flower-heads small, numerous, corymbed, with a campanulate involucre of lance-linear imbricated scales and with from 10 to 15 tubular yellowish-white florets, having a bristly pappus in a single row; odor faintly aromatic; taste strongly bitter.

Average dose.—2 Gm. (30 grains).

EXTRACTUM ALOES

Extract of Aloes

Aloes, *one hundred grammes*	100 Gm.
Boiling Water, *one thousand cubic centimeters*	1000 Cc.

Mix the Aloes with the Boiling Water in a suitable vessel, stirring constantly until the particles of Aloes are thoroughly disintegrated, and allow the mixture to stand for twelve hours; then pour off the clear liquid, strain the residue, and evaporate the mixed liquids to dryness with the aid of a water-bath or steam-bath.

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

EXTRACTUM BELLADONNÆ FOLIORUM

Extract of Belladonna Leaves

[EXTRACTUM BELLADONNÆ FOLIORUM ALCOHOLICUM, PHARM. 1890]

Belladonna Leaves, in No. 60 powder, *one thousand grammes* .	1000 Gm.
Alcohol, **Water,** each, *a sufficient quantity.*	

Mix *two thousand cubic centimeters* of Alcohol with *one thousand cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until *three thousand cubic centimeters* of tincture are obtained, or the Belladonna Leaves are exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to *one hundred cubic centimeters*, mix the residue with the reserved portion, and evaporate at or below the above-mentioned temperature to a pilular consistence.

When assayed by the process given below, Extract of Belladonna Leaves should contain 1.4 percent. of mydriatic alkaloids. If the Extract should be found by the assay to contain more than this percentage, sufficient powdered sugar of milk should be added to reduce it to the standard of 1.4 percent.

Assay of Extract of Belladonna Leaves

Extract of Belladonna Leaves, five grammes . . . . 5 Gm.
Alcohol.
Ammonia Water.
Distilled Water.
Chloroform.
Normal Sulphuric Acid V.S.
Tenth-normal Sulphuric Acid V.S.
Fiftieth-normal Potassium Hydroxide V.S.
Cochineal T.S. or Iodeosin T.S., each a sufficient quantity.

Introduce the Extract of Belladonna Leaves into a small beaker and dissolve it in a mixture consisting of [illegible] distilled water [illegible] ammonia water [illegible]. When [illegible] transfer it to a separator, rinsing the beaker with a little alcohol and adding the rinsings to the separator. Insert the stopper [illegible] and shake the separator for half a minute. Draw off the [illegible] separator and add to the first separator 10 Cc. more of chloroform [illegible] shake it for half a minute, allow to separate, and again draw off the chloroform layer into the second separator. Repeat this with 10 Cc. more of chloroform. To the united chloroformic liquids in the second separator add [illegible] normal sulphuric acid V.S. and [illegible] Cc. of distilled water, and shake it for half a minute. Draw off the chloroform layer, after the liquids have separated, [illegible] the first separator after cleaning it thoroughly, and the acid [illegible] a beaker, and repeat the process by adding to the first separator [illegible] distilled water and [illegible] normal sulphuric acid V.S. Draw off the chloroform [illegible] the same, and then run the acid aqueous [illegible] the beaker. Pass the [illegible] through a pledget of cotton [illegible] the first separator after cleaning it thoroughly, rinsing the [illegible] separator [illegible] funnel with about 10 Cc. of distilled water. To the first separator [illegible] a small piece of red litmus paper and [illegible] ammonia water to produce a distinctly alkaline reaction. Shake the separator for half a minute, and when the liquids have separated, draw off the chloroform layer into a beaker. Repeat this process with [illegible] chloroform and evaporate the combined [illegible] beaker [illegible] in a water-bath containing warm water [illegible] ether and allow the latter to evaporate [illegible] normal sulphuric acid [illegible] then titrate the excess of acid [illegible] potassium hydroxide V.S. Divide the number of [illegible] potassium hydroxide V.S. used by 5, subtract [illegible] normal sulphuric acid V.S. taken, and [illegible] obtain the percentage of [illegible] contained in the Extract of Belladonna Leaves. [illegible] represents the weight in grammes of mydriatic alkaloids [illegible] required to neutralize 1 Cc. of tenth-normal sulphuric acid V.S.

Average dose.—0.010 Gm. = 10 milligrammes (⅙ grain).

EXTRACTUM CANNABIS INDICÆ

Extract of Indian Cannabis

Indian Cannabis, in No. 20 powder, one thousand grammes . . 1000 Gm.
Alcohol, a sufficient quantity.

Moisten the powder with *three hundred cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding Alcohol, until the Indian Cannabis is exhausted. Distil off the Alcohol from the percolate by means of a water-bath, and evaporate the residue, in a porcelain dish, on a water-bath, to a pilular consistence.

Average dose.—0.010 Gm. = 10 milligrammes ($\frac{1}{6}$ grain).

EXTRACTUM CIMICIFUGÆ

Extract of Cimicifuga

Fluidextract of Cimicifuga, *one hundred cubic centimeters* . .	100 Cc.
Glycyrrhiza (peeled, Russian), in No. 80 powder, *a sufficient quantity*,	
To make *twenty-five grammes* . .	25 Gm.

Evaporate the Fluidextract of Cimicifuga in a porcelain dish, by means of a water-bath, at a temperature not exceeding 70° C. (158° F.), with constant stirring, to complete dryness. Reduce the product to a fine powder and add enough powdered Glycyrrhiza to make the finished Extract weigh *twenty-five grammes*. Mix thoroughly.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

EXTRACTUM COLCHICI CORMI

Extract of Colchicum Corm

[EXTRACTUM COLCHICI RADICIS, PHARM. 1890]

Colchicum Corm, in No. 60 powder, *one thousand grammes* . .	1000 Gm.
Acetic Acid, *three hundred and fifty cubic centimeters*	350 Cc.
Water, *a sufficient quantity*.	

Mix the Acetic Acid with *fifteen hundred cubic centimeters* of Water, and, having moistened the powder with *five hundred cubic centimeters* of the mixture, pack it moderately in a cylindrical glass percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding, first, the remainder of the menstruum, and then Water, until the Colchicum Corm is exhausted. Evaporate the percolate in a porcelain vessel, by means of a water-bath, at a temperature not exceeding 80° C. (176° F.), to a pilular consistence.

When assayed by the process given below, Extract of Colchicum Corm should contain 1.4 percent. of colchicine. If the Extract should be found by assay to contain more than this percentage, sufficient powdered sugar of milk should be added to reduce it to the standard of 1.4 percent.

Assay of Extract of Colchicum Corm

Extract of Colchicum Corm, *four grammes* . . . . 4 Gm.
Chloroform,
Alcohol,
Ether,
Distilled Water,
Ammonia Water, each, *a sufficient quantity.*

Dissolve the Extract of Colchicum Corm in 20 Cc. of distilled water, carefully transfer the solution to a graduated flask, and add sufficient alcohol to make the liquid measure 100 Cc. Shake the flask well, allow it to stand for five minutes, filter, and collect 50 Cc. of the filtrate (representing 2 Gm. of the Extract), and evaporate it to dryness in a porcelain dish by means of a water-bath. Add to the residue 10 Cc. of ether and 5 Cc. of distilled water, stir the mixture well and heat it gently until the ether is evaporated. After cooling, pour off the aqueous solution, filtering it into a separator, retaining as much of the insoluble matter in the dish as possible. Again treat the residue with 10 Cc. of ether, and 5 Cc. of water, and proceed as before; rinse the dish and filter with a little water and collect all of the aqueous liquids in the separator. Introduce a small piece of red litmus paper into the separator, add enough ammonia water to render the liquid alkaline, and then shake it out with three successive portions of chloroform, of 20, 15, and 10 Cc., respectively. Collect the combined chloroformic solutions in an Erlenmeyer flask, evaporate the chloroform, and add to the alkaloidal residue two successive small portions of alcohol, evaporating the alcohol each time. Now add to the residue a mixture of 5 Cc. of distilled water and 10 Cc. of ether, agitate the liquid gently and evaporate the ether; after cooling, filter the aqueous liquid into a separator. Rinse the flask with distilled water, pass the rinsings through the filter into the separator, and shake out the aqueous solutions with three successive portions of chloroform, 20, 15, and 10 Cc., respectively. Collect the combined chloroformic solutions in a tared Erlenmeyer flask, evaporate the chloroform, and treat the alkaloidal residue with two successive small portions of alcohol, evaporating the alcohol each time, and dry the residue, at 100° C. (212° F.), to a constant weight. The weight multiplied by 50 will give the percentage of colchicine in the Extract of Colchicum Corm.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

EXTRACTUM COLOCYNTHIDIS

Extract of Colocynth

Colocynth, freed from the seeds, *one thousand grammes* . . . . 1000 Gm.
Diluted Alcohol, *a sufficient quantity.*

Reduce the Colocynth to a coarse powder by grinding or bruising, and macerate it in *thirty-five hundred cubic centimeters* of Diluted Alcohol for four days, with occasional stirring; then express strongly, and strain through flannel. Pack the residue, previously broken up with the hands, firmly in a cylindrical percolator, cover it with the strainer, and gradually pour Diluted Alcohol upon it until the tincture and expressed liquid, mixed together, measure *five thousand cubic centimeters.* Distil off the Alcohol from the mixture by means of a water-bath, evaporate the residue to dryness, and reduce the dry mass to powder.

Extract of Colocynth should be kept in well-stoppered bottles.

Average dose.— 0.030 Gm. = 30 milligrammes ($\frac{1}{2}$ grain).

EXTRACTUM COLOCYNTHIDIS COMPOSITUM

Compound Extract of Colocynth

Extract of Colocynth, *one hundred and sixty grammes*	160 Gm.
Purified Aloes, *five hundred grammes*	500 Gm.
Cardamom, in No. 60 powder, *sixty grammes*	60 Gm.
Resin of Scammony, in fine powder, *one hundred and forty grammes*	140 Gm.
Soap, dried, and in coarse powder, *one hundred and forty grammes*	140 Gm.
Alcohol, *one hundred cubic centimeters*	100 Cc.

Heat the Purified Aloes, contained in a suitable vessel, on a water-bath, until it is completely melted; then add the Alcohol, Soap, Extract of Colocynth, and Resin of Scammony, and heat the mixture at a temperature not exceeding 120° C. (248° F.), until it is perfectly homogeneous, and a thread taken from the mass becomes brittle when cool. Then withdraw the heat, thoroughly incorporate the Cardamom with the mixture, and cover the vessel until the contents are cold. Finally, reduce the product to a fine powder.

Compound Extract of Colocynth should be kept in well-stoppered bottles.

Average dose.— 0.500 Gm. = 500 milligrammes ($7\frac{1}{2}$ grains).

EXTRACTUM DIGITALIS

Extract of Digitalis

Fluidextract of Digitalis, *one hundred cubic centimeters*	100 Cc.

Evaporate the Fluidextract of Digitalis in a porcelain dish, by means of a water-bath, at a temperature not exceeding 50° C. (122° F.), with constant stirring, until it is reduced to a pilular consistence.

Average dose.— 0.010 Gm. = 10 milligrammes ($\frac{1}{6}$ grain).

EXTRACTUM ERGOTÆ

Extract of Ergot

Ergot, in No. 40 powder, *one thousand grammes*	1000.0 Gm.
Diluted Hydrochloric Acid, *fifty grammes*	50.0 Gm.
Monohydrated Sodium Carbonate, *eight and one-half grammes*	8.5 Gm.
Glycerin, *twelve and one-half grammes*	12.5 Gm.
Alcohol, **Water**, each, *a sufficient quantity*,	
To make *one hundred and twenty-five grammes*	125 Gm.

Mix *one thousand cubic centimeters* of Alcohol with *four hundred cubic centimeters* of Water, and, having moistened the powder with *five hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add sufficient menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Ergot is exhausted. Evaporate the percolate in a porcelain dish, by means of a water-bath, at a temperature not exceeding 50° C. (122° F.), to *two hundred and fifty grammes;* add *two hundred and fifty cubic centimeters* of Water, and stir; filter when cold, rinse the dish with a little Water, and add this to the filter. Add the Diluted Hydrochloric Acid to the filtrate; then set it aside for twenty-four hours; filter, wash the contents of the filter with Water until the washings no longer have an acid reaction, and add the washings to the filtrate. To this, add gradually the Monohydrated Sodium Carbonate, and, when the evolution of carbon dioxide has ceased, evaporate the liquid in a tared dish until it weighs *one hundred and fifty grammes;* add the Glycerin, and continue the evaporation, at the above-named temperature, until the weight of the Extract is reduced to *one hundred and twenty-five grammes.*

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

EXTRACTUM EUONYMI

Extract of Euonymus

Fluidextract of Euonymus, *one hundred cubic centimeters*	100 Cc.
Glycyrrhiza (peeled, Russian), in No. 80 powder, *a sufficient quantity*,	
To make *twenty-five grammes*	25 Gm.

Evaporate the Fluidextract of Euonymus in a porcelain dish, by means of a water-bath, at a temperature not exceeding 70° C. (158° F.), with constant stirring, to complete dryness. Reduce the product to a fine powder, and add enough powdered Glycyrrhiza to make the finished extract weigh *twenty-five grammes.* Mix thoroughly.

Average dose.— 0.125 Gm. = 125 milligrammes (2 grains).

EXTRACTUM GENTIANÆ

Extract of Gentian

Gentian, in No. 20 powder, *one thousand grammes*	**1000 Gm.**
Water, *a sufficient quantity.*	

Moisten the powder with *four hundred cubic centimeters* of Water, and let it macerate for twenty-four hours; then pack it in a conical percolator, and gradually pour Water upon it until the infusion passes but slightly imbued with the properties of the Gentian. Reduce the liquid to three-fourths of its bulk by boiling, and strain; then, by means of a water-bath, evaporate to a pilular consistence.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

EXTRACTUM GLYCYRRHIZÆ

Extract of Glycyrrhiza

The commercial extract of the root of *Glycyrrhiza glabra* Linné, or of *Glycyrrhiza glandulifera* Waldstein and Kitaibel (Fam. *Leguminosæ*).

In flattened cylindrical rolls, from 15 to 18 Cm. long, and from 15 to 30 Mm. thick; of a glossy black color. It breaks with a sharp, conchoidal, shining fracture, and has a very sweet, peculiar taste. Not less than 60 percent. of it should be soluble in cold water.

Average dose.— 1 Gm. (15 grains).

EXTRACTUM GLYCYRRHIZÆ PURUM

Pure Extract of Glycyrrhiza

Glycyrrhiza, peeled, in No. 20 powder, *one thousand grammes* .	**1000 Gm.**
Ammonia Water, *one hundred and fifty cubic centimeters* . . .	**150 Cc.**
Glycerin,	
Water, each, *a sufficient quantity.*	

Mix the Ammonia Water with *three thousand cubic centimeters* of Water, and, having moistened the powder with *one thousand cubic centimeters* of the mixture, allow it to macerate in a closed vessel for twenty-four hours. Then pack it moderately in a cylindrical glass percolator, and gradually pour upon it, first the remainder of the menstruum, and then Water, until the Glycyrrhiza is exhausted. Lastly, evaporate the liquid in a tared porcelain dish, by means of a water-bath, to a pilular consistence, and while the mass is still warm, incorporate with it 5 percent. of its weight of Glycerin.

Average dose.—1 Gm. (15 grains).

EXTRACTUM HÆMATOXYLI

Extract of Hematoxylon

Hematoxylon, rasped, *one thousand grammes*	1000 Gm.
Water, *ten thousand cubic centimeters*	10000 Cc.

Macerate the Hematoxylon with the Water for forty-eight hours. Then boil (avoiding the use of metallic vessels) until one-half of the Water has evaporated; strain the decoction, while hot, and evaporate it to dryness.

Average dose.—1 Gm. (15 grains).

EXTRACTUM HYOSCYAMI

Extract of Hyoscyamus

Fluidextract of Hyoscyamus, *one hundred cubic centimeters*	100 Cc.

Evaporate the Fluidextract of Hyoscyamus in a porcelain dish, by means of a water-bath, at a temperature not exceeding 50° C. (122° F.), constantly stirring, until it is reduced to a pilular consistence.

When assayed as directed below, Extract of Hyoscyamus should contain 0.3 percent. of mydriatic alkaloids. If the Extract should be found by the assay to contain more than this percentage, sufficient powdered sugar of milk should be added to reduce it to the standard of 0.3 percent.

Assay of Extract of Hyoscyamus

The method to be employed is identical with that given on page 134, using *ten grammes* of Extract of Hyoscyamus instead of the quantity of Extract of Belladonna Leaves there directed, and multiplying the product by 10 instead of 20.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

EXTRACTUM KRAMERIÆ

Extract of Krameria

Krameria, in No. 40 powder, *one thousand grammes*	1000 Gm.
Water, *a sufficient quantity.*	

Moisten the powder with *three hundred cubic centimeters* of Water, pack it in a conical glass percolator, and gradually pour Water upon it, until the infusion passes but slightly imbued with the astringency of the Krameria. Heat the liquid to the boiling point, strain, and evaporate the strained liquid, by means of a water-bath, at a temperature not exceeding 70° C. (158° F.), to dryness.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

EXTRACTUM LEPTANDRÆ

Extract of Leptandra

Fluidextract of Leptandra, *one hundred cubic centimeters* . .	100 Cc.
Glycyrrhiza (peeled, Russian), in No. 80 powder, *a sufficient quantity,*	
To make *twenty-five grammes* . .	25 Gm.

Evaporate the Fluidextract of Leptandra in a porcelain dish, by means of a water-bath, at a temperature not exceeding 70° C. (158° F.), with constant stirring, to complete dryness. Reduce the product to a fine powder and add enough powdered Glycyrrhiza to make the finished Extract weigh *twenty-five grammes.* Mix thoroughly.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

EXTRACTUM MALTI

Extract of Malt

Malt, in coarse powder, not finer than No. 12, *one thousand grammes*	1000 Gm.
Water, *a sufficient quantity.*	

Upon the powder, contained in a suitable vessel, pour *one thousand cubic centimeters* of Water, and macerate for six hours. Then add *four thousand cubic centimeters* of Water, heated to about 30° C. (86° F.), and digest for an hour at a temperature not exceeding 55° C. (131° F.). Strain the mixture with strong expression. Finally, by means of a water-bath, or vacuum apparatus, at a temperature not exceeding

55° C. (131° F.), evaporate the strained liquid rapidly to the consistence of thick honey.

Extract of Malt should be kept in well-closed vessels, in a cool place.

Average dose.—16 Cc. (4 fluidrachms).

EXTRACTUM NUCIS VOMICÆ

Extract of Nux Vomica

Nux Vomica, in No. 20 powder, *one thousand grammes* . . .	1000 Gm.
Acetic Acid,	
Water,	
Alcohol,	
Sugar of Milk, dried and in fine powder, each, *a sufficient quantity.*	

Mix *five hundred cubic centimeters* of Acetic Acid with *thirteen hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it moderately in a cylindrical glass percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and then Water, until the percolate passes but faintly imbued with bitterness, and the Nux Vomica is exhausted. Reserve the first *seven hundred and fifty cubic centimeters* of the percolate, and, having heated the remainder to boiling, filter, and evaporate the filtrate to a soft extract; dissolve this in the reserved portion, and add enough Water to make the liquid measure *nine hundred cubic centimeters.* To the liquid thus obtained, add *three thousand cubic centimeters* of Alcohol, shake the mixture well, and set it aside for twenty-four hours, with occasional agitation. Filter the liquid through paper, and wash the residue in the filter with a mixture of Alcohol three volumes, and Water one volume, until the washings are only faintly bitter. Evaporate the filtrate and washings in a porcelain dish, on a water-bath, to dryness. Determine, by the method given below, the percentage of strychnine in the dry Extract; ascertain, by calculation, the amount of strychnine in the remainder of the Extract; add to this enough well-dried Sugar of Milk to bring the quantity of strychnine in the final dry Extract of Nux Vomica to 5 percent. of the total weight; and, when thoroughly powdered and mixed, transfer the Extract to small, well-stoppered vials.

Extract of Nux Vomica, when assayed by the following process, should be found to contain 5 percent. of strychnine.

Assay of Extract of Nux Vomica

Extract of Nux Vomica, *two grammes* . . . . 2 Gm.
Distilled Water,
Ether,
Chloroform,
Ammonia Water,
Sulphuric Acid Solution (3 percent. H_2SO_4),
Nitric Acid (sp. gr. 1.42),
Sodium Hydroxide Solution (1 in 10),
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Iodeosin T.S., each, *a sufficient quantity.*

Introduce the Extract of Nux Vomica into a beaker, and dissolve it in 25 Cc. of a mixture of 16 Cc. of ether, 5 Cc. of chloroform, and 4 Cc. of ammonia water. When dissolved, transfer it to a separator, rinsing the beaker with a little chloroform, and adding the rinsings to the separator. Insert the stopper securely and shake the separator carefully for a few minutes. Draw off the aqueous layer into another separator, washing the ether-solution and separator with a little water, and adding this to the second separator. Then shake out the aqueous liquid with two portions of 15 and 10 Cc., respectively, of chloroform, and add these to the first separator. If a few drops of the liquid left in the second separator still give a reaction with mercuric potassium iodide T.S. after acidulating, repeat the shaking out with 10 Cc. more of chloroform. Now shake out the chloroformic solution in the first separator with three portions of 15, 10, and 10 Cc. of sulphuric acid solution (3 percent.), and collect the combined acid solutions in another separator. Introduce a small piece of red litmus paper, add enough ammonia water to render the liquid alkaline, and extract the mixture with three portions, respectively, of 15, 10, and 10 Cc. of chloroform. Draw off the chloroformic solutions into a beaker, and evaporate the chloroform with the aid of a water-bath. Dissolve the alkaloidal residue in the beaker in 15 Cc. of 3 percent. sulphuric acid solution by the aid of a water-bath, and allow the liquid to cool. To this solution add 3 Cc. of a cooled mixture of equal volumes of nitric acid (specific gravity 1.42) and distilled water, and after rotating the liquid a few times, set it aside for exactly ten minutes, stirring it gently three times during this interval. Transfer the resulting red liquid to a separator containing 25 Cc. of an aqueous solution of sodium hydroxide (1 in 10), and wash the beaker three times with very small amounts of distilled water, and add the washings to the separator. If the liquid is not quite turbid, add 2 Cc. more of the solution of sodium hydroxide. Now add 20 Cc. of chloroform to the separator, and shake it well by a rotating motion for a few minutes, allow the liquids to separate, and draw off the chloroform through a small filter, wetted with chloroform, into a flask. Repeat this twice, using 10 Cc. of chloroform each time, and draw off both portions into the flask, using the same filter. Finally, wash the filter and funnel with 5 Cc. of chloroform, and then evaporate all the chloroform by means of a water-bath, very carefully, to avoid decrepitation. To the alkaloidal residue, add 10 Cc. of tenth-normal sulphuric acid V.S., 5 drops of iodeosin T.S., about 90 Cc. of distilled water, and 20 Cc. of ether. When all the alkaloid is dissolved, titrate the excess of acid with fiftieth-normal potassium hydroxide V.S. until the aqueous liquid just turns pink. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract this number from 10 (the 10 Cc. of tenth-normal sulphuric acid V.S. taken), multiply the remainder by 0.0332, and this product by 50, which will give the percentage of strychnine contained in the Extract of Nux Vomica.

Average dose.— 0.015 Gm. = 15 milligrammes ($\frac{1}{4}$ grain).

EXTRACTUM OPII

Extract of Opium

Powdered Opium, *one hundred grammes*	100 Gm.
Sugar of Milk, recently dried and in fine powder,	
Water, each, *a sufficient quantity.*	

Rub the Powdered Opium, in a mortar, into a smooth paste with *two hundred and fifty cubic centimeters* of Water; then transfer to a bottle of the capacity of *one thousand cubic centimeters,* wash the mortar with *seven hundred and fifty cubic centimeters* of water in successive portions, and add the washings to the contents of the bottle. Cork the bottle, and shake it vigorously once every two hours during twelve hours. Then filter through a rapidly acting, double filter, and pour water on the magma slowly, until the filtrate passes nearly colorless and only faintly bitter.

Concentrate the filtrate and washings in a tared dish, on a water-bath, until the contents weigh about *two hundred grammes,* and allow the Extract to become cold. Then weigh it accurately, transfer *twelve grammes* to an Erlenmeyer flask having a capacity of about *one hundred cubic centimeters,* and determine in this portion the amount of morphine by the process of assay given below, using the same quantities of liquids as there directed for *four grammes* of the dry Extract. In another portion of *five grammes* determine the amount of water by drying it in a flat-bottomed dish, at 100° C. (212° F.), until it ceases to lose weight. From the results thus obtained, ascertain by calculation the amount of morphine and of water contained in the remainder of the Extract, add to this enough well-dried Sugar of Milk to bring the quantity of morphine in the final dry Extract to 20 percent., then evaporate the whole to dryness, reduce it to powder, and transfer it to small, well-stoppered vials.

Assay of Extract of Opium

Extract of Opium, dried at 100° C. (212° F.), *four grammes* .	4.0 Gm.
Ammonia Water, *two and two-tenths cubic centimeters*	2.2 Cc.
Alcohol,	
Ether,	
Water,	
Lime Water, each, *a sufficient quantity.*	

Dissolve the Extract of Opium in 30 Cc. of water, filter the solution through a small filter, and wash the filter and residue with water, until all soluble matters are extracted, collecting the washings separately. Evaporate, in a tared dish, on a water-bath, first, the washings to a small volume, then add the first filtrate, and evaporate the whole to a weight of 10 Gm. Rotate the concentrated solution in the dish, until the rings of extract are redissolved, pour the liquid into a tared Erlenmeyer flask having a capacity of about 100 Cc., and rinse the dish with a few drops of water at a time, until the entire solution weighs 15 Gm. Add 7 Gm. (or 8.5 Cc.) of alcohol, shake the flask well, then add 20 Cc. of ether, and repeat the shaking. Now add the ammonia water from a graduated pipette or burette, stopper the flask with a sound cork, shake it thoroughly during ten minutes, and then set it aside, in a moderately cool place, for at least six hours, or over night.

Remove the stopper carefully, and, should any crystals adhere to it, brush them into the flask. Place in a small funnel two rapidly acting filters, of a diameter of 7 Cm., plainly folded, one within the other (the triple fold of the inner filter being laid against the single side of the outer filter), wet them well with ether, and decant the ether-solution as completely as possible upon the inner filter. Add 15 Cc. of ether to the contents of the flask, rotate it, and again decant the ethereal layer upon the inner filter. Repeat this operation with another portion of 15 Cc. of ether. Then pour into the filter the liquid in the flask, in portions, in such a way as to transfer the greater portion of the crystals to the filter, and, when the liquid has passed through, transfer the remaining crystals to the filter by washing the flask with several portions of water, using not more than about 10 Cc. in all. Allow the double filter to drain, then apply water to the crystals, drop by drop, until they are practically free from mother-liquor, and afterwards wash them with alcohol (previously saturated with powdered morphine), added drop by drop from a pipette. When this has passed through, displace the remaining alcohol by ether, using about 10 Cc., or more if necessary. Allow the filter to dry in a moderately warm place, at a temperature not exceeding 60° C. (140° F.), until its weight remains constant, then carefully transfer the crystals of morphine to a tared watch-glass and weigh them.

Transfer the crystals (which are not quite pure) to an Erlenmeyer flask, add lime water in the proportion of 10 Cc. for each 0.1 Gm. of morphine, and shake the flask at intervals for twenty-five minutes. Pass the liquid through two counterpoised, rapidly acting, plainly folded filters, one within the other (the triple fold of the inner filter being laid against the single side of the outer filter), and rinse the flask with additional lime water, passing the washings through the filter until the filtrate, after acidulation, no longer yields a precipitate with mercuric potassium iodide T.S. Then press the filters between bibulous paper, dry them to a constant weight, and weigh the contents of the inner filter, using the outer as a counterpoise. Subtract the weight of the insoluble matter, on the filter, from the weight of the impure morphine previously found, and the difference, multiplied by 25, will be the percentage of pure crystalline morphine contained in the Extract of Opium.

Average dose.—0.030 Gm. = 30 milligrammes (½ grain).

EXTRACTUM PHYSOSTIGMATIS

Extract of Physostigma

Physostigma, in No. 80 powder, *one thousand grammes* . . . . **1000 Gm.**
Alcohol,
Glycyrrhiza (peeled, Russian), in No. 80 powder, each, *a sufficient quantity.*

Moisten the Physostigma with *four hundred cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding Alcohol, until *three thousand cubic centimeters* of percolate are obtained, or the Physostigma is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to *one hundred cubic centimeters*: mix this with the reserved portion, and evaporate, at or below the above-mentioned temperature, on a water-bath, to dryness. Remove *one gramme* of the Extract, and assay this by the process given below: from the results thus obtained, ascertain by calculation the amount of ether-soluble alkaloids contained in the remainder of the Extract, add to this enough powdered Glycyrrhiza to bring the quantity of the alkaloids in the finished powdered Extract to 2 percent., reduce to powder, mix thoroughly, and transfer it at once to well-stoppered, amber-colored vials.

Extract of Physostigma, when assayed by the following process, should be found to contain 2 percent. of ether-soluble alkaloids.

Assay of Extract of Physostigma

Extract of Physostigma, [illegible]	**1 Gm.**
Alcohol.	
Diluted Alcohol,	
Ether.	
Sodium Bicarbonate.	
Normal Sulphuric Acid V.S.,	
Distilled Water.	
Tenth-normal Sulphuric Acid V.S.,	
Fiftieth-normal Potassium Hydroxide V.S.,	
Iodeosin T.S., each, a sufficient quantity.	

Transfer the Extract of Physostigma to a small porcelain dish, add 5 Cc. of diluted alcohol, and digest for five minutes in a water-bath below boiling temperature; then add about 5 Gm. of very clean, fine quartz sand, and evaporate to dryness on a water-bath, triturating thoroughly with a pestle to secure uniform admixture. When dry, carefully transfer the contents of the dish to an Erlenmeyer flask, add a little more sand to the dish and, by rubbing, remove any adherent extract, which transfer to the flask, add 10 Cc. of ether, and shake the flask. Then add 1 Cc. of an aqueous solution of sodium bicarbonate (1 in 20), and shake the contents vigorously at intervals for one hour. Allow the mixture to stand, and, when settled, decant 5 Cc. of the ethereal solution into a separator, to which add a small piece of blue litmus paper, sufficient normal sulphuric acid V.S. to render the liquid acid, and 10 Cc. of distilled water. Shake the separator well for one minute, and draw off the aqueous layer into another separator. Repeat the shaking-out process, using 2 Cc. of normal sulphuric acid V.S. and 5 Cc. of distilled water, and add the aqueous layer to the second separator. Again repeat the extraction, using 1 Cc. of normal sulphuric acid V.S. and 5 Cc. of distilled water, and add this to the second separator. To the combined acid liquids in the second separator add 25 Cc. of ether, a small piece of red litmus paper and sufficient sodium bicarbonate solution (1 in 20) to render it alkaline. Shake the separator for one minute, allow the liquids to separate, and draw off the ether into a beaker. Repeat the shaking-out process with 20 Cc. and again with 15 Cc. of ether added to the separator; shake each time for one minute, allow the liquids to separate, and draw off the ether into the beaker. Carefully evaporate the ether from the combined solutions by means of a water-bath, and, when dry, dissolve the residue in 2 Cc. of tenth-normal sulphuric acid V.S.; rinse the solution carefully into a 200 Cc. flask with distilled water, add enough distilled water to bring the volume to about 90 Cc., add 25 Cc. of ether, and having shaken the flask, add 5 drops of iodeosin T.S., then titrate the excess of acid with fiftieth-normal potassium hydroxide V.S., until, after shaking, the aqueous liquid just acquires a pink color. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from 2 (the 2 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.0273, and this product by 200; the result will be the percentage of ether-soluble alkaloids contained in the Extract of Physostigma.

Average dose.—0.008 Gm. = 8 milligrammes ($\frac{1}{8}$ grain).

EXTRACTUM QUASSIÆ

Extract of Quassia

Quassia, in No. 20 powder, *one thousand grammes*	1000 Gm.
Water,	
Sugar of Milk, recently dried and in fine powder, each, *a sufficient quantity,*	
To make *one hundred grammes* . .	100 Gm.

Moisten the Quassia with *four hundred cubic centimeters* of Water, pack it firmly in a conical percolator, and gradually pour Water upon it until the infusion passes but slightly imbued with bitterness. Reduce the liquid to three-fourths of its bulk by boiling, and strain; then evaporate, by means of a water-bath, to dryness and add enough Sugar of Milk to make the Extract weigh *one hundred grammes.* Mix thoroughly, reduce to fine powder, and transfer to well-stoppered bottles.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

EXTRACTUM RHAMNI PURSHIANÆ

Extract of Cascara Sagrada

Cascara Sagrada, in No. 60 powder, *one thousand grammes* . .	1000 Gm.
Alcohol,	
Water,	
Glycyrrhiza (peeled, Russian), in No. 80 powder, each, *a sufficient quantity,*	
To make *two hundred and fifty grammes* . .	250 Gm.

Mix *one hundred and twenty-five cubic centimeters* of Alcohol with *eight hundred and seventy-five cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the drug is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder on a water-bath, at a temperature not exceeding 70° C. (158° F.), to the consistence of syrup. Mix this with the reserved portion, and continue the evaporation, at or below the above-mentioned temperature, to dryness. Reduce the Extract to fine powder, and add enough powdered Glycyrrhiza to make the product weigh *two hundred and fifty grammes*. Mix thoroughly.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

EXTRACTUM RHEI

Extract of Rhubarb

Fluidextract of Rhubarb, *one hundred cubic centimeters* . . 100 Cc.

Evaporate the Fluidextract of Rhubarb in a porcelain dish, by means of a water-bath, with constant stirring, at a temperature not exceeding 50° C. (122° F.), to a pilular consistence.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

EXTRACTUM SCOPOLÆ

Extract of Scopola

Fluidextract of Scopola, *one hundred cubic centimeters* . 100 Cc.

Evaporate the Fluidextract of Scopola in a porcelain dish, by means of a water-bath, at a temperature not exceeding 50° C. (122° F.), with constant stirring, to a pilular consistence.

When assayed as directed below, Extract of Scopola should contain 2 percent. of mydriatic alkaloids. If the Extract should be found by the assay to contain more than this percentage, sufficient powdered sugar of milk should be added to reduce it to the standard of 2 percent.

Assay of Extract of Scopola

The method to be employed is identical with that given on page 154, using *two grammes* of Extract of Scopola instead of the quantity of Extract of Belladonna Leaves there directed. The product must be multiplied by 5, instead of 20.

Average dose.—0.010 Gm. = 10 milligrammes ($\frac{1}{6}$ grain).

EXTRACTUM STRAMONII

Extract of Stramonium

Fluidextract of Stramonium, *one hundred cubic centimeters* . . 100 Cc.

Evaporate the Fluidextract of Stramonium in a porcelain dish, by means of a water-bath, at a temperature not exceeding 50° C. (122° F.), with constant stirring, to a pilular consistence.

When assayed as directed below, Extract of Stramonium should contain 1.0 percent. of mydriatic alkaloids. If the Extract should be found by the assay to contain more than this percentage, sufficient powdered sugar of milk should be added to reduce it to the standard of 1.0 percent.

Assay of Extract of Stramonium

The method to be employed is identical with that given for Extract of Belladonna Leaves, on page 134, using *five grammes* of Extract of Stramonium.

Average dose.— 0.010 Gm. = 10 milligrammes ($\frac{1}{6}$ grain).

EXTRACTUM SUMBUL

Extract of Sumbul

Fluidextract of Sumbul, *one hundred cubic centimeters* . . . . 100 Cc.

Evaporate the Fluidextract of Sumbul in a porcelain dish, by means of a water-bath, at a temperature not exceeding 70° C. (158° F.), with constant stirring, to a pilular consistence.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

EXTRACTUM TARAXACI

Extract of Taraxacum

Taraxacum, in No. 30 powder, *one thousand grammes* . . . . 1000 Gm.
Alcohol,
Water, each, *a sufficient quantity.*

Mix *one hundred and twenty-five cubic centimeters* of Alcohol with *eight hundred and seventy-five cubic centimeters* of Water, and, having moistened the powder with *two hundred and fifty cubic centimeters* of the mixture, pack it in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Taraxacum is exhausted. Evaporate the percolate, by means of a water-bath, to a pilular consistence.

Average dose.—1 Gm. (15 grains).

FEL BOVIS

Oxgall

The fresh bile of *Bos taurus* Linné.

A brownish-green or dark green, somewhat viscid liquid, having a peculiar, unpleasant odor, and a disagreeable, bitter taste.

Specific gravity: 1.015 to 1.025 at 25° C. (77° F.).

It is neutral, or has a faintly alkaline reaction upon litmus paper.

A mixture of 2 drops of Oxgall and 10 Cc. of water, when treated, first, with a drop of a freshly prepared solution of 1 part of sugar in 4 parts of water, and afterwards with sulphuric acid, cautiously added, until the precipitate first formed is redissolved, gradually acquires a brownish-red color, changing, successively, to carmine, purple, and violet.

FEL BOVIS PURIFICATUM

Purified Oxgall

Oxgall, *three hundred cubic centimeters*	300 Cc.
Alcohol, *one hundred cubic centimeters*	100 Cc.

Evaporate the Oxgall, in a tared porcelain dish, on a water-bath, to about *one hundred grammes*, then add to it the Alcohol, mix the whole thoroughly, and set it aside, well covered, for three or four days. Then decant the clear solution, filter the remainder, and, having mixed the liquids and distilled off the Alcohol, evaporate the residue to a pilular consistence.

A yellowish-green, soft solid, having a peculiar odor, and a partly sweet and partly bitter taste.

Very soluble in water and in alcohol.

A solution of 1 part of Purified Oxgall in about 100 parts of water behaves toward sugar and sulphuric acid in the same manner as the solution mentioned under *Fel Bovis*.

An aqueous solution of Purified Oxgall should be clear, and should remain transparent upon the addition of an equal volume of alcohol (evidence of proper purification).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

FERRI CARBONAS SACCHARATUS

Saccharated Ferrous Carbonate

Saccharated Ferrous Carbonate should contain not less than 15 per-cent. of Ferrous Carbonate [$FeCO_3 = 115.05$], and should be kept in small, well-stoppered bottles.

Ferrous Sulphate, *fifty grammes*	50 Gm.
Sodium Bicarbonate, *thirty-five grammes*	35 Gm.
Sugar, in fine powder,	
Distilled Water, each, *a sufficient quantity,*	
To make *one hundred grammes* . .	100 Gm.

Dissolve the Ferrous Sulphate in *two hundred cubic centimeters* of hot Distilled Water, and the Sodium Bicarbonate in *five hundred cubic centimeters* of Distilled Water at a temperature not exceeding 50° C. (122° F.), and filter the solutions separately. To the solution of Sodium Bicarbonate contained in a flask having a capacity of about *one thousand cubic centimeters* add, gradually, the solution of Ferrous Sulphate, and mix thoroughly by rotating the flask. Fill the flask with boiling Distilled Water, cork it loosely, and set the mixture aside. When the precipitate has subsided, draw off the clear supernatant liquid by means of a siphon, and then fill the flask again with hot Distilled Water, and shake it. Again draw off the clear liquid, and repeat the washing with hot Distilled Water in the same manner until the decanted liquid gives merely a slight cloudiness with barium chloride T.S. Finally, drain the precipitate thoroughly on a muslin strainer, transfer it to a porcelain dish containing *eighty grammes* of Sugar, and mix it intimately. Evaporate the mixture to dryness, by means of a water-bath, reduce it to powder, and mix intimately with it, if necessary, enough well-dried Sugar to make the final product weigh *one hundred grammes.*

A greenish-brown powder, gradually becoming oxidized by contact with air, without odor, and having at first a sweetish, afterwards a slightly ferruginous taste.

Only partially soluble in water, but completely soluble upon the addition of hydrochloric acid, with copious evolution of carbon dioxide, forming a clear, greenish-yellow liquid.

If 1 Gm. of Saccharated Ferrous Carbonate be dissolved in 5 Cc. of hydrochloric acid, and the solution diluted with water until it measures 50 Cc., portions of this solution will yield a blue precipitate with both potassium ferrocyanide T.S. and potassium ferricyanide T.S., but should not give more than a slight cloudiness with barium chloride T.S. (absence of *sulphate*).

If 1.15 Gm. of Saccharated Ferrous Carbonate be dissolved in 10 Cc. of diluted sulphuric acid (1 to 5) and the solution diluted with water to about 100 Cc., it should require not less than 15 Cc. of tenth-normal potassium dichromate V.S.

for complete oxidation, potassium ferricyanide T.S. being used as indicator (corresponding to not less than 15 percent. of ferrous carbonate).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

FERRI CHLORIDUM

Ferric Chloride

Ferric Chloride should contain not less than 22 percent. of metallic iron in the form of chloride.

Solution of Ferric Chloride, *one hundred grammes*	100 Gm.
To make *forty grammes* . .	40 Gm.

Evaporate the Solution of Ferric Chloride on a water-bath until it weighs *forty grammes;* then set it aside in a glass-covered vessel, until it forms a crystalline mass. Lastly, break the salt into pieces, and keep it in glass-stoppered bottles, protected from light.

Orange-yellow, crystalline pieces, odorless, or having a faint odor of hydrochloric acid, and a strongly styptic taste.

Very deliquescent in moist air.

Freely and completely soluble in water and in alcohol; also in a mixture of 1 part of ether and 3 parts of alcohol.

At 35.5° C. (96° F.) the salt fuses to a reddish-brown liquid. When strongly heated, it decomposes, losing water and hydrochloric acid, while the anhydrous salt sublimes, leaving a residue of ferric oxide.

The dilute, aqueous solution of the salt shows an acid reaction with blue litmus paper, yields a brownish-red precipitate with ammonia water, a blue precipitate with potassium ferrocyanide T.S., and a white precipitate, insoluble in nitric acid, with silver nitrate T.S.

If 1 Gm. of the salt, dissolved in 25 Cc. of boiling water, be treated with an excess of ammonia water, the filtrate should be colorless, and, after acidulation with hydrochloric acid, 20 Cc. of the solution should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

On adding a clear crystal of ferrous sulphate to a cooled mixture of equal volumes of concentrated sulphuric acid and an aqueous solution of the salt (1 in 10), the crystal should not become brown in color, nor should a brownish-black color be developed around it within five minutes (limit of *nitric acid*).

If to a solution of the salt (1 in 50) a few drops of freshly prepared potassium ferricyanide T.S. be added, a pure brown color should be produced, which should not turn at once to a green or greenish-blue (absence of *ferrous salt*).

If 1 Gm. of dry Ferric Chloride be dissolved in sufficient water to measure [illegible] then 55.5 Cc. of this solution, when measured into a glass-stoppered [illegible] capacity of about 250 Cc., followed by 3 Cc. of hydrochloric acid, [illegible] potassium iodide, should, after securely stoppering the flask and [illegible] an hour at 40° C. (104° F.), and cooling, require not less than [illegible]-normal sodium thiosulphate V.S. for complete decolorization [illegible] tenth-normal sodium thiosulphate V.S. indicating 1 percent. of [illegible]

[illegible]—0.065 Gm. = 65 milligrammes (1 grain).

FERRI CITRAS

Ferric Citrate

It should contain Ferric Citrate corresponding in amount to not less than 16 percent. of metallic iron, and should be kept in well-stoppered bottles, protected from light.

Thin, transparent, garnet-red scales, without odor, and having a slightly ferruginous taste.

Slowly but completely soluble in water at 25° C. (77° F.), and readily soluble in hot water, but diminishing in solubility with age; insoluble in alcohol.

When strongly heated, the salt chars, and finally leaves a residue of ferric oxide, which, when moistened with hot water, should not show an alkaline reaction upon red litmus paper (absence of *citrates* or *tartrates* of the *alkali metals*).

An aqueous solution of the salt shows an acid reaction with blue litmus paper, and is not precipitated, but rendered darker in color, by ammonia water.

With potassium ferrocyanide T.S. the aqueous solution yields a bluish-green color or precipitate, which is increased and rendered dark blue by the subsequent addition of hydrochloric acid (difference from *iron and ammonium citrate*).

If Ferric Citrate be heated with potassium hydroxide T.S., it yields a brownish-red precipitate, without evolving ammonia.

If an aqueous solution of the salt (1 in 10) be deprived of its iron by boiling with an excess of potassium hydroxide T.S., and the filtrate be slightly acidulated with acetic acid, a portion of the cooled liquid, when mixed with a little calcium chloride T.S., and again heated to boiling, will gradually afford a white crystalline precipitate.

Another portion of the acidulated and cooled liquid, when allowed to stand for twenty-four hours, should not deposit a white crystalline precipitate (absence of *tartrate*).

If 0.555 Gm. of Ferric Citrate be dissolved in 15 Cc. of water and 2 Cc. of hydrochloric acid, in a glass-stoppered flask having a capacity of about 100 Cc., with the aid of a gentle heat, and if, after the addition of 1 Gm. of potassium iodide, and securely closing the flask, the mixture be kept for half an hour at 40° C. (104° F.), and then cooled, it should require not less than 16 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid, starch T.S. being used as indicator (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 1 percent. of metallic iron).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

FERRI ET AMMONII CITRAS

Iron and Ammonium Citrate

It should contain Iron and Ammonium Citrate corresponding in amount to not less than 16 percent. of metallic iron, and should be kept in well-stoppered bottles, protected from light.

Thin, transparent, garnet-red scales, without odor, and having a saline, mildly ferruginous taste; deliquescent in moist air.

Readily and completely soluble in water, but insoluble in alcohol.

When strongly heated, the salt chars, and finally leaves a residue of ferric oxide, which, when moistened with hot water, should not show an alkaline reaction with red litmus paper (absence of *citrates* or *tartrates* of the *alkali metals*).

An aqueous solution of the salt is neutral to litmus paper.

The aqueous solution is not precipitated, but rendered darker in color, by ammonia water.

With potassium ferrocyanide T.S. the solution does not afford a blue color or precipitate, unless it be acidulated with hydrochloric acid (difference from *ferric citrate*).

If Iron and Ammonium Citrate be heated with potassium hydroxide T.S., it yields a brownish-red precipitate, and ammonia is evolved.

If an aqueous solution of the salt (1 in 10) be deprived of its iron by boiling with an excess of potassium hydroxide T.S., and the filtrate be slightly acidulated with acetic acid, a portion of the cooled liquid, when mixed with a little calcium chloride T.S., and again heated to boiling, will gradually deposit a white, crystalline precipitate.

Another portion of the acidulated and cooled liquid, when allowed to stand for twenty-four hours, should not yield a white, crystalline precipitate (absence of *tartrate*).

If 0.555 Gm. of the salt be dissolved in 15 Cc. of water and 2 Cc. of hydrochloric acid, in a glass-stoppered flask having a capacity of about 100 Cc., and if, after the addition of 1 Gm. of potassium iodide, and securely closing the flask, the mixture be kept for half an hour at 40° C. (104° F.), and then cooled, it should require not less than 16 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid, starch T.S. being used as indicator (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 1 percent. of metallic iron).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

FERRI ET AMMONII SULPHAS

Ferric Ammonium Sulphate

$FeNH_4(SO_4)_2 + 12H_2O = 478.69$

It should contain, in the uneffloresced condition, 99.5 percent. of pure Ferric Ammonium Sulphate, and not less than 11.5 percent. of metallic iron. It should be kept in well-stoppered bottles, protected from light.

Pale violet, octahedral crystals, without odor, and having an acid, styptic taste; efflorescent on exposure to the air.

Soluble in 2.7 parts of water at 25° C. (77° F.), and in 0.8 part of boiling water; insoluble in alcohol.

When strongly heated, the crystals fuse, lose their water of crystallization, expand, and finally leave a pale brown residue.

The aqueous solution of the salt has an acid reaction upon blue litmus paper, and yields with potassium ferrocyanide T.S. a blue precipitate, and with barium chloride T.S. a white precipitate insoluble in hydrochloric acid.

With potassium hydroxide T.S. Ferric Ammonium Sulphate yields a brownish-red precipitate, and if the mixture be heated, ammonia gas is evolved.

If the iron be wholly precipitated from a solution of the salt by treating it with an excess of potassium hydroxide T.S., the resulting filtrate, when neutralized with hydrochloric acid, and then mixed with ammonia water, should not yield a white, gelatinous precipitate (absence of *aluminum*).

The addition of 3 Cc. of nitric acid to 30 Cc. of a solution of the salt (1 in 20), followed by a few drops of silver nitrate T.S., should not produce any turbidity (absence of *chlorides*).

If 0.555 Gm. of the uneffloresced crystals of the salt be dissolved in 15 Cc. of water and 2 Cc. of hydrochloric acid, in a glass-stoppered flask having a capacity of about 100 Cc., and if, after the addition of 1 Gm. of potassium iodide, and securely closing the flask, the mixture be kept for half an hour at

40° C. (104° F.), and then cooled, it should require not less than 11.5 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 1 percent. of metallic iron).

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

FERRI ET AMMONII TARTRAS

Iron and Ammonium Tartrate

It should contain Iron and Ammonium Tartrate corresponding in amount to not less than 13 percent. of metallic iron, and should be kept in well-stoppered bottles, protected from light.

Thin, transparent scales, varying in color from garnet-red to reddish-brown, without odor, and having a sweetish, slightly ferruginous taste; slightly deliquescent in the air. Very soluble in water; insoluble in alcohol.

When strongly heated, the salt chars, emits fumes having the odor of burning sugar, and finally leaves a residue of ferric oxide, which, when moistened with hot water, should not show an alkaline reaction upon red litmus paper (absence of *citrates* or *tartrates* of the *alkali metals*).

An aqueous solution of Iron and Ammonium Tartrate should be acid to litmus paper, and is not precipitated, but rendered darker in color, by ammonia water.

With potassium ferrocyanide T.S. the solution does not yield a blue color or precipitate, unless it be acidulated with hydrochloric acid.

If Iron and Ammonium Tartrate be heated with potassium hydroxide T.S., it yields a brownish-red precipitate, and ammonia is evolved.

If an aqueous solution of the salt (1 in 10) be deprived of its iron by boiling with an excess of potassium hydroxide T.S., the filtrate, when slightly acidulated with acetic acid, will gradually deposit a white, crystalline precipitate.

If 0.555 Gm. of the dry salt be dissolved in 15 Cc. of water and 2 Cc. of hydrochloric acid, in a glass-stoppered flask having a capacity of about 100 Cc., and if, after the addition of 1 Gm. of potassium iodide, and securely closing the flask, the mixture be kept for half an hour at 40° C. (104° F.), and then cooled, it should require not less than 13 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid, starch T.S. being used as indicator (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 1 percent. of metallic iron).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

FERRI ET POTASSII TARTRAS

Iron and Potassium Tartrate

It should contain Iron and Potassium Tartrate corresponding in amount to not less than 15 percent. of metallic iron, and should be kept in well-stoppered bottles, protected from light.

Thin, transparent scales, varying in color from garnet-red to reddish-brown, without odor, and having a sweetish, ferruginous taste; slightly deliquescent in the air.

Very soluble in water; insoluble in alcohol.

When strongly heated, the salt chars, emits fumes having an odor resembling that of burning sugar, and finally leaves a dark brown residue, having a strongly alkaline reaction, and effervescing with acids (distinction from *iron and ammonium tartrate*).

An aqueous solution of Iron and Potassium Tartrate should be neutral to litmus paper, and is not precipitated, but rendered darker in color, by ammonia water.

With potassium ferrocyanide T.S. the solution does not afford a blue color or precipitate, unless it be acidulated with hydrochloric acid.

When heated with potassium hydroxide T.S., the salt yields a brownish-red precipitate.

If an aqueous solution of the salt (1 in 10) be deprived of its iron by boiling with an excess of potassium hydroxide T.S., the filtrate, when slightly acidulated with acetic acid, will gradually deposit a white, crystalline precipitate.

If 0.555 Gm. of the dry salt be dissolved in 15 Cc. of water and 2 Cc. of hydrochloric acid, in a glass-stoppered flask having a capacity of about 100 Cc., and if, after the addition of 1 Gm. of potassium iodide, and securely closing the flask, the mixture be kept for half an hour at 40° C. (104° F.), and then cooled, it should require not less than 15 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid, starch T.S. being used as indicator (each Cc. of tenth-normal sodium thiosulphate V.S. indicating 1 percent. of metallic iron).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

FERRI ET QUININÆ CITRAS

Iron and Quinine Citrate

It should contain not less than 11.5 percent. of dried quinine, and ferric citrate corresponding in amount to not less than 13.5 percent. of metallic iron. It should be kept in well-stoppered bottles, protected from light.

Thin, transparent scales, of a reddish-brown color, without odor, and having a bitter, mildly ferruginous taste; slowly deliquescent.

Slowly but completely soluble in cold water, more readily soluble in hot water, partially soluble in alcohol. Its solubility is diminished by age.

When strongly heated, the salt chars, and finally leaves a residue of ferric oxide, which, when moistened with hot water, should not show an alkaline reaction upon red litmus paper (absence of *citrates* or *tartrates* of the *alkali metals*).

The aqueous solution of the salt shows an acid reaction with blue litmus paper.

On the addition of a slight excess of ammonia water the color of the solution is deepened, and a white, curdy precipitate is produced.

The filtrate from this precipitate does not afford a blue color with potassium ferrocyanide T.S., unless it be acidulated with hydrochloric acid.

Another portion of the filtrate, heated with an excess of potassium hydroxide T.S., deposits a brownish-red precipitate.

If an aqueous solution of the salt (1 in 10) be deprived of its iron and quinine by boiling with an excess of potassium hydroxide T.S., and the filtrate slightly acidulated with acetic acid, a portion of the cooled liquid, when mixed with a little calcium chloride T.S., and again heated to boiling, gradually deposits a white, crystalline precipitate.

Another portion of the acidulated and cooled liquid, when allowed to stand for some time, should not deposit a white, crystalline precipitate (absence of *tartrate*).

Assay for the Quinine

Introduce 1.11 Gm. of Iron and Quinine Citrate into a dish, and, with the aid of a gentle heat, dissolve it in 20 Cc. of water. Transfer the solution, together with the rinsings of the dish, to a separator, allow the liquid to become cold, then add 5 Cc. of ammonia water and 10 Cc. of chloroform, and shake the separator for one minute. Allow the liquids to separate, draw off the chloroformic layer, and shake the residuary liquid a second and a third time with portions of 10 Cc. each of chloroform. Allow the combined chloroformic solutions to evaporate spontaneously in a tared dish, and dry the residue at 100° C. (212° F.) to a constant weight. This residue should weigh not less than 0.1276 Gm. (corresponding to at least 11.5 percent. of dried quinine), and should conform to the reactions and tests under *Quinina*.

Assay for the Iron

Heat the aqueous liquid, from which the quinine has been removed in the manner just described, on a water-bath, until the odor of chloroform and of ammonia have disappeared, allow it to cool, and dilute it with water to the volume of 50 Cc. Transfer 25 Cc. of the liquid to a glass-stoppered flask having the capacity of about 100 Cc., add 3 Cc. of hydrochloric acid and 1 Gm. of potassium iodide, and, after securely closing the flask, allow the mixture to stand for half an hour at 40° C. (104° F.). After it has been allowed to cool, it should require not less than 13.5 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid, starch T.S. being used as indicator (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 1 percent. of metallic iron).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

FERRI ET QUININÆ CITRAS SOLUBILIS

Soluble Iron and Quinine Citrate

It should contain not less than 11.5 per cent. of dried quinine, and ferric citrate corresponding in amount to not less than 13.5 percent. of metallic iron. It should be kept in well-stoppered bottles, protected from light.

Thin, transparent scales, of a greenish, golden-yellow color, without odor, and having a bitter, mildly ferruginous taste; deliquescent.

Rapidly and completely soluble in cold water, partially soluble in alcohol.

When strongly heated, the salt chars, and finally leaves a residue of ferric oxide, which, when moistened with hot water, should not show an alkaline reaction upon red litmus paper (absence of *citrates* or *tartrates* of the *alkali metals*).

An aqueous solution of the salt shows a slightly acid reaction with blue litmus paper.

On the addition of a slight excess of ammonia water the color of the liquid is deepened, and a white, curdy precipitate is produced.

With potassium ferrocyanide T.S. a portion of the filtrate from this precipitate does not yield a blue color or precipitate, unless it be acidulated with hydrochloric acid.

When heated with potassium hydroxide T.S., the salt affords a brownish-red precipitate, and ammonia is evolved.

If an aqueous solution of the salt (1 in 10) be deprived of its iron and quinine by boiling with an excess of potassium hydroxide T.S., and the filtrate be slightly acidulated with acetic acid, a portion of the cooled liquid, when mixed with a little calcium chloride T.S., and again heated to boiling, will gradually deposit a white, crystalline precipitate.

Another portion of the acidulated and cooled liquid, when allowed to stand for twenty-four hours, should not give a white, crystalline precipitate (absence of *tartrate*).

Soluble Iron and Quinine Citrate, when assayed for Quinine and Iron by the method described under *Ferri et Quininæ Citras*, should respond to the same requirements as the latter.

***Average dose.*— 0.250 Gm. = 250 milligrammes (4 grains).**

FERRI ET STRYCHNINÆ CITRAS

Iron and Strychnine Citrate

It should contain not less than 0.9 nor more than 1 percent. of strychnine, and ferric citrate corresponding in amount to not less than 16 percent. of metallic iron. It should be kept in well-stoppered bottles, protected from light.

Thin, transparent scales, varying in color from garnet-red to yellowish-brown, without odor, and having a bitter, slightly ferruginous taste; deliquescent in moist air.

Readily and completely soluble in water, partially soluble in alcohol.

When strongly heated, the salt chars, and finally leaves a residue of ferric oxide, which, when moistened with hot water, should not show an alkaline reaction with red litmus paper (absence of *citrates* or *tartrates* of the *alkali metals*).

The aqueous solution of Iron and Strychnine Citrate is slightly acid to litmus paper, and is not immediately precipitated, but rendered darker in color, by ammonia water.

With potassium ferrocyanide T.S. the aqueous solution does not yield a blue color or precipitate, unless it be acidulated with hydrochloric acid.

On heating with potassium hydroxide T.S., the salt affords a brownish-red precipitate, evolving ammonia.

If an aqueous solution of the salt (1 in 10) be deprived of its iron and strychnine by boiling with an excess of potassium hydroxide T.S., and the filtrate be slightly acidulated with acetic acid, a portion of the cooled liquid, when mixed with a little calcium chloride T.S., and again heated to boiling, will gradually deposit a white, crystalline precipitate.

Another portion of the acidulated and cooled liquid, when allowed to stand for twenty-four hours, should not deposit a white, crystalline precipitate (absence of *tartrate*).

Assay for the Strychnine

Dissolve 4.44 Gm. of Iron and Strychnine Citrate, in a separator, in 15 Cc. of water, add 5 Cc. of ammonia water and 10 Cc. of chloroform, and shake the separator for one minute. Allow the liquids to separate, draw off the chloroformic layer, and shake the residuary liquid a second and a third time with portions of 10 Cc. each of chloroform. Allow the combined chloroformic liquids to evaporate spontaneously in a tared dish, and dry the residue at 100° C. (212° F.) to a constant weight. This residue should weigh not less than 0.04 (0.0399) Gm., nor more than 0.0444 Gm. (corresponding to not less than 0.9 nor more than 1 percent. of strychnine), and should respond to the reactions and tests given under *Strychnina*.

Assay for the Iron

Heat the aqueous liquid, from which the strychnine has been removed in the manner just described, on a water-bath, until the odors of chloroform and of ammonia have disappeared, allow it to cool, and dilute it with water to the volume of 100 Cc. Transfer 25 Cc. of the liquid to a glass-stoppered flask having the capacity of about 100 Cc., add 4 Cc. of hydrochloric acid and 1 Gm. of potassium iodide, and, after securely closing the flask, allow the mixture to stand for half an hour at 40° C. (104° F.). After it has been allowed to cool, it should require not less than 32 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid, starch T.S. being used as indicator (each Cc. of tenth-normal sodium thiosulphate V.S. indicating one-half per cent. of metallic iron).

Average dose.— 0.125 Gm. = 125 milligrammes (2 grains).

FERRI HYDROXIDUM

Ferric Hydroxide

$Fe(OH)_3 = 106.14$

[FERRI OXIDUM HYDRATUM, PHARM. 1890]

Solution of Ferric Sulphate, *one hundred cubic centimeters* . .	100 Cc.
Ammonia Water, *one hundred and thirty-eight cubic centimeters* .	138 Cc.
Water, *a sufficient quantity.*	

To the Ammonia Water, previously diluted with *five hundred cubic centimeters* of cold water, add, with constant stirring, the Solution of Ferric Sulphate, previously diluted with *one thousand cubic centimeters* of cold Water. As soon as the precipitate has subsided, draw off the clear liquid by means of a siphon, then mix the precipitate intimately with about *one thousand cubic centimeters* of cold Water, again draw off the clear liquid after subsidence of the precipitate, and repeat this operation, until a portion of the decanted liquid gives not more than a slight cloudiness with barium chloride test solution. Finally, transfer the precipitate to a wet muslin strainer, and, after it has drained, mix it with sufficient cold Water to make the mixture weigh *three hundred grammes.*

Ferric Hydroxide, thus prepared, is a brownish-red magma, wholly soluble in hydrochloric acid without effervescence.

FERRI HYDROXIDUM CUM MAGNESII OXIDO

Ferric Hydroxide with Magnesium Oxide

[FERRI OXIDUM HYDRATUM CUM MAGNESIA, PHARM. 1890]

Solution of Ferric Sulphate, *forty cubic centimeters*	40 Cc.
Magnesium Oxide, *ten grammes*	10 Gm.
Water, *a sufficient quantity.*	

Mix the Solution of Ferric Sulphate with *one hundred and twenty-five cubic centimeters* of Water, and keep the liquid in a large, well-stoppered bottle. Rub the Magnesium Oxide with cold Water to a smooth and thin mixture, transfer this to a bottle capable of holding about *one thousand cubic centimeters*, and fill it with Water to about three-fourths of its capacity. When the preparation is wanted for use, shake the Magnesium Oxide mixture to a homogeneous, thin magma, add it gradually to the diluted Solution of Ferric Sulphate, and shake them together until a uniform, smooth mixture results.

NOTE.—For the rapid preparation of this antidote to arsenical poisoning, the diluted Solution of Ferric Sulphate, and the mixture of Magnesium Oxide with Water, should always be kept on hand, in separate bottles, ready for immediate use.

Average dose.— Arsenical antidote, 120 Cc. (4 fluidounces).

FERRI HYPOPHOSPHIS

Ferric Hypophosphite

$Fe(PH_2O_2)_3 = 249.09$

It should contain not less than 98 percent. of pure Ferric Hypophosphite $[(PH_2O.O)_3Fe]$, and should be kept in well-stoppered bottles.

A white, or grayish-white powder, odorless and nearly tasteless; permanent in the air.

Soluble in 2300 parts of water at 25° C. (77° F.), and in 1200 parts of boiling water; more readily soluble in the presence of hypophosphorous acid, or in a warm, concentrated solution of an alkali citrate, forming with the latter a green solution.

When strongly heated in a dry test-tube, the salt evolves spontaneously inflammable hydrogen phosphide gas, and, on complete ignition, leaves a residue of ferric pyrophosphate.

Ferric Hypophosphite is readily oxidized by nitric acid or other oxidizing agents.

If to 1 Gm. of the salt 10 Cc. of acetic acid be added, no effervescence should occur (absence of *carbonate*), and if the mixture be subsequently heated to boiling, the filtrate should respond to the following tests:

The addition of a few drops of silver nitrate T.S. to a portion of the filtrate should, upon warming, cause a brown to black coloration or precipitate. If another portion of the filtrate be added drop by drop to an excess of mercuric chloride T.S., a white precipitate of mercurous chloride is formed upon gently heating.

Another portion of the cold filtrate should afford no turbidity with ammonium oxalate T.S. (absence of *calcium*).

If 0.5 Gm. of the salt be boiled with 10 Cc. of potassium hydroxide T.S., a reddish-brown precipitate will be produced; and if to the filtrate from the latter, slightly acidulated with hydrochloric acid, magnesia mixture T.S. be added, and subsequently an excess of ammonia water, no crystalline precipitate should be produced (absence of *phosphate*).

If 1 Gm. of the salt be dissolved in about 25 Cc. of boiling water by the aid of sufficient hydrochloric acid, added drop by drop, then a slight excess of ammonia water added, the filtrate from the reddish-brown precipitate should be colorless, and, after acidulating with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Average dose.— 0.200 Gm. = 200 milligrammes (3 grains).

FERRI PHOSPHAS SOLUBILIS

Soluble Ferric Phosphate

It should contain Ferric Phosphate corresponding in amount to not less than 12 percent. of metallic iron, and should be kept in amber-colored, well-stoppered bottles, protected from light.

Thin, bright green, transparent scales, without odor, and having an acidulous, slightly saline taste. The salt is permanent in dry air when excluded from light, but when unprotected, soon becomes dark and discolored.

Freely and completely soluble in water; insoluble in alcohol.

The aqueous solution of the salt shows a slightly acid reaction with blue litmus paper. The addition of ammonia water to the solution of the salt produces a reddish-brown color.

If Soluble Ferric Phosphate be boiled with potassium hydroxide T.S., it affords a brownish-red precipitate without evolving ammonia.

Dissolve 0.1 Gm. of the salt in 2 Cc. of warm water, add 5 Cc. of potassium hydroxide T.S., boil and filter. Neutralize the filtrate with hydrochloric acid, add 2 Cc. of magnesia mixture T.S. and ammonia water in slight excess. A white, crystalline precipitate is produced, which, if well washed on a filter, is turned yellow by silver nitrate T.S.

To 1 Gm. of the salt dissolved in 10 Cc. of water, add 15 Cc. or a slight excess of boiling potassium hydroxide T.S., and, after thoroughly mixing, filter. The filtrate, after strongly acidulating with hydrochloric acid and adding 10 Cc. of magnesia mixture T.S., followed by a slight excess of ammonia water, will afford an abundant, white, crystalline precipitate.

If 0.555 Gm. of the salt be dissolved in 10 Cc. of water, in a glass-stoppered flask having a capacity of about 100 Cc., and 2 Cc. of hydrochloric acid and 40 Cc. of water added, and if, after the addition of 1 Gm. of potassium iodide, and securely closing the flask, the mixture be kept for half an hour at 40° C. (104° F.), and then cooled, it should require not less than 12 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid (each Cc. of tenth-normal sodium thiosulphate V.S. indicating 1 percent. of metallic iron).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

FERRI PYROPHOSPHAS SOLUBILIS

Soluble Ferric Pyrophosphate

It should contain Ferric Pyrophosphate corresponding in amount to not less than 10 percent. of metallic iron, and should be kept in amber-colored, well-stoppered bottles, protected from light.

Thin, apple-green, transparent scales, without odor, and having an acidulous, slightly saline taste. The salt is permanent in dry air, when excluded from light, but when unprotected, soon becomes discolored.

Freely and completely soluble in water; insoluble in alcohol. The aqueous solution of the salt shows a slightly acid reaction with blue litmus paper.

If Soluble Ferric Pyrophosphate be boiled with potassium hydroxide T.S., it affords a brownish-red precipitate without evolving the odor of ammonia.

If 0.1 Gm. of the salt be fused with 0.1 Gm. each of potassium nitrate and sodium carbonate, and the residue boiled with 10 Cc. of distilled water and filtered, the filtrate, after being rendered nearly, but not quite, neutral with highly diluted nitric acid, should yield a yellow precipitate upon the addition of silver nitrate T.S.

If 0.555 Gm. of the salt be dissolved in 10 Cc. of water, in a glass-stoppered flask having a capacity of about 100 Cc., and 8 Cc. of hydrochloric acid and 40 Cc. of water added, and if, after the addition of 2 Gm. of potassium iodide, and securely closing the flask, the mixture be kept for half an hour at 40° C. (104° F.), and then cooled, it should require not less than 10 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the color of the liquid (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 1 percent. of metallic iron).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

FERRI SULPHAS

Ferrous Sulphate

$FeSO_4 + 7H_2O = 276.01$

It should contain not less than 99.5 percent. of pure Ferrous Sulphate [$SO_2.O_2Fe + 7H_2O$]; the crystals should not be effloresced, and should be kept in well-stoppered bottles.

Large, pale bluish-green, monoclinic prisms, without odor, and having a saline, styptic taste; efflorescent in dry air. On exposure to moist air, the crystals rapidly oxidize, and become coated with brownish-yellow, basic ferric sulphate.

Soluble in 0.9 part of water at 25° C. (77° F.), and in 0.3 part of boiling water; insoluble in alcohol.

When slowly heated to 115° C. (239° F.), the crystals disintegrate, and lose 38.87 percent. of their weight (6 molecules of water of crystallization).

The aqueous solution of the salt shows an acid reaction with blue litmus paper, and, even when highly diluted, gives with potassium ferricyanide T.S. a blue color or precipitate, and with barium chloride T.S. a white precipitate insoluble in hydrochloric acid.

If 1 Gm. of the salt be dissolved in about 25 Cc. of water, containing 1 Cc. of diluted sulphuric acid, the solution heated to boiling, oxidized with nitric acid, and then mixed with a slight excess of ammonia water, the filtrate from the reddish-brown precipitate produced should be colorless, and, after acidulating with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If another portion of the salt be oxidized and precipitated as directed above, the filtrate, on evaporation to dryness and ignition, should not leave any weighable residue (absence of salts of the *alkali metals*).

If 1 Gm. of Ferrous Sulphate, in small fragments, be agitated during four or five minutes with 10 Cc. of alcohol, the filtrate should not redden moistened blue litmus paper (absence of *free acid*).

If 1.38 Gm. of the salt, in uneffloresced crystals, be dissolved in about 25 Cc. of diluted sulphuric acid, not less than 49.75 Cc. of tenth-normal potassium permanganate V.S. should be required to impart to the liquid a permanent pink color (each Cc. of the tenth-normal potassium permanganate V.S. indicating 2 percent. of crystallized Ferrous Sulphate).

Average dose.— 0.200 Gm. = 200 milligrammes (3 grains).

FERRI SULPHAS EXSICCATUS

Exsiccated Ferrous Sulphate

Ferrous Sulphate, in coarse powder, *one hundred grammes* . . 100 Gm.

Allow the salt to effloresce at a temperature of about 40° C. (104° F.), in dry air, and then heat it in a porcelain dish, on a water-bath, constantly stirring, until the product weighs from *sixty-four* to *sixty-five grammes.* Lastly, reduce the residue to a fine powder, and transfer it at once to perfectly dry, well-stoppered bottles.

A grayish-white powder, slowly but completely soluble in water, and conforming to the reactions and tests given under *Ferri Sulphas.*

Average dose.— 0.125 Gm. = 125 milligrammes (2 grains).

FERRI SULPHAS GRANULATUS

Granulated Ferrous Sulphate

$FeSO_4 + 7H_2O = 276.01$

Ferrous Sulphate, *one hundred grammes*	100 Gm.
Distilled Water, *one hundred cubic centimeters*	100 Cc.
Diluted Sulphuric Acid, *five cubic centimeters*	5 Cc.
Alcohol, *twenty-five cubic centimeters*	25 Cc.

Dissolve the Ferrous Sulphate in the Distilled Water previously heated to boiling, add the Diluted Sulphuric Acid, and filter the solution while hot. Evaporate the solution immediately in a tared porcelain dish, on a sand-bath, until it weighs *one hundred and fifty grammes*, and then cool it quickly, with constant stirring. Transfer the product to a glass funnel stopped with a plug of purified cotton, and, when it has thoroughly drained, pour upon it the Alcohol. When this has also drained, spread the crystalline powder on bibulous paper, dry it quickly at the ordinary temperature, and transfer it at once to perfectly dry, well-stoppered bottles.

Granulated Ferrous Sulphate is a very pale bluish-green, crystalline powder, which should conform in every respect to the reactions and tests given under *Ferri Sulphas.*

Average dose.— 0.200 Gm. = 200 milligrammes (3 grains).

FERRUM

Iron

Fe = 55.5

Metallic iron, in the form of fine, bright, and non-elastic wire.

FERRUM REDUCTUM

Reduced Iron

Reduced Iron should contain not less than 90 percent. of pure metallic iron.

A very fine, grayish-black, lustreless powder, without odor or taste; permanent in dry air.

Insoluble in water or alcohol.

One Gm. of Reduced Iron, when treated with 20 Cc. of diluted sulphuric acid, in a test-flask (see page 522), causes the evolution of nearly odorless hydrogen gas, which should not affect, within five minutes, paper moistened with lead acetate T.S. (limit of *sulphide*), and on applying a gentle heat, the Iron should dissolve in the acid without leaving more than 1 percent. of residue.

When ignited in contact with air, it glows and is converted into black ferroso-ferric oxide.

If 1 Gm. of Reduced Iron be shaken with 5 Cc. of water, the liquid should not change the color of red litmus paper.

To 0.5 Gm. of Reduced Iron, contained in a small covered beaker, add 20 Cc. of diluted sulphuric acid; after the reaction has somewhat subsided, warm the liquid on a water-bath until the reaction ceases, then collect any minute undissolved residue of impure iron arsenide upon a very small filter, rinse the beaker with water, add the rinsings to the filter, and wash the residue with water until free from acid reaction. Transfer the residue to the beaker by rinsing it back, and, after adding about 0.25 Gm. of potassium chlorate and 5 Cc. of hydrochloric acid, evaporate the solution slowly to dryness on a water-bath. Dissolve the residue in sufficient water to measure 50 Cc., then add 5 Cc. of this solution to 5 Cc. of a saturated solution of sulphurous acid and heat the liquid on a water-bath for fifteen minutes, until all traces of sulphurous acid have been removed. The resulting solution should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Assay for Metallic Iron

Introduce about 2.6 Gm. of iodine into a 100 Cc. flask and weigh accurately, then add 6 Cc. of water, 2 Gm. of potassium iodide, and 0.555 Gm. of Reduced Iron. Securely stopper the flask, and, after thoroughly mixing the contents by rotating the flask, set it aside for one hour. Then dilute the contents with sufficient distilled water to make the liquid measure exactly 100 Cc., mix well, and to 25 Cc. of this solution add a few drops of starch T.S., followed by tenth-normal sodium thiosulphate V.S., added slowly, with constant stirring, until the blue or greenish color has been discharged. Divide the weight of iodine taken, by 0.02518, and subtract from the quotient twice the number of Cc. of tenth-normal sodium thiosulphate V.S. used; the remainder represents the percentage of metallic iron present in the Reduced Iron, and this should not be less than 90 percent.

Note.—The percentage purity of the iodine employed should be accurately determined by a previous experiment, and in place of the 2.6 Gm. above directed, its equivalent in pure (100 percent.) iodine may be taken (see Appendix, Test No. 137).

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

FICUS

Fig

The partially dried fruit of *Ficus Carica* Linné (Fam. *Moraceæ*).

Usually compressed, of irregular shape, fleshy, brownish or yellowish, frequently with an efflorescence of sugar; apex with a small scaly orifice; base with a scar or short stalk; internally hollow, with numerous small, brownish-yellow, glossy and hard akenes; odor distinct, fruity; taste sweet, pleasant.

FLUIDEXTRACTUM ACONITI

Fluidextract of Aconite

[Extractum Aconiti Fluidum, Pharm. 1890]

Aconite, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Aconite is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, in a porcelain dish, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, mixing thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of aconitine in the remainder of the liquid, add to this enough menstruum to make each *one hundred cubic centimeters* of the finished Fluidextract contain 0.4 Gm. of aconitine.

Assay of Fluidextract of Aconite

Fluidextract of Aconite, *ten cubic centimeters* . . . . **10 Cc.**
Ether,
Distilled Water,
Ammonia Water,
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Cochineal T.S., each, *a sufficient quantity.*

Transfer 10 Cc. of Fluidextract of Aconite by means of a graduated pipette to a porcelain dish, and evaporate it carefully to dryness on a water-bath at a temperature not exceeding 60° C. (140° F.). Add 5 Cc. of tenth-normal sulphuric acid V.S. and 25 Cc. of distilled water. When the extract is dissolved, filter the liquid into a separator, washing the dish and filter with about 25 Cc. of distilled water; when this has passed through, add 25 Cc. of ether and 2 Cc. of ammonia water to the separator, and agitate for one minute. Draw off the lower layer into a flask and filter the ether-solution into a beaker. Return the contents of the flask to the separator, add 15 Cc. of ether, and agitate for one minute. Draw off the lower layer into the flask and filter the ether-solution into the beaker. Repeat, with two other portions of 10 Cc. each of ether. Evaporate the ether-solution to dryness, and dissolve the residue in 3 Cc. of tenth-normal sulphuric acid V.S. diluted with 20 Cc. of distilled water. Add to the solution 5 drops of cochineal T.S., and then carefully run in fiftieth-normal potassium hydroxide V.S. until a pink color is produced. Divide the number of Cc. of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract this number from 3 (the 3 Cc. of tenth-normal sulphuric acid V.S. taken), multiply the remainder by 0.064, and this product by 10, which will give the weight in grammes of aconitine contained in *one hundred cubic centimeters* of the Fluidextract of Aconite.

Average dose.— 0.05 Cc. (1 minim).

FLUIDEXTRACTUM APOCYNI

Fluidextract of Apocynum

[EXTRACTUM APOCYNI FLUIDUM, PHARM. 1890]

Apocynum, in No. 60 powder, *one thousand grammes*	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *six hundred cubic centimeters* of Alcohol and *three hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards a mixture of Alcohol and Water, made in the proportion of *six hundred cubic centimeters* of Alcohol to *four hundred cubic centimeters* of Water, until the Apocynum is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM AROMATICUM

Aromatic Fluidextract

[EXTRACTUM AROMATICUM FLUIDUM, PHARM. 1890]

Aromatic Powder, *one thousand grammes*	1000 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred and fifty cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Aromatic Powder is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM AURANTII AMARI

Fluidextract of Bitter Orange Peel

[EXTRACTUM AURANTII AMARI FLUIDUM, PHARM. 1890]

Bitter Orange Peel, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *three hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it moderately in a conical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Orange Peel is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM BELLADONNÆ RADICIS

Fluidextract of Belladonna Root

[EXTRACTUM BELLADONNÆ RADICIS FLUIDUM, PHARM. 1890]

Belladonna Root, in No. 60 powder, *one thousand grammes* .	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *three* *hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Belladonna Root is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract, dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of alkaloids in the remainder of the liquid; add to this enough menstruum to make each *one hundred cubic centimeters* of the finished Fluidextract contain 0.4 Gm. of mydriatic alkaloids from Belladonna Root.

Assay of Fluidextract of Belladonna Root

Fluidextract of Belladonna Root, *ten cubic centimeters* . . 10 Cc.
Distilled Water,
Ammonia Water,
Chloroform,
Normal Sulphuric Acid, V.S.,
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Cochineal T.S., or **Iodeosin T.S.,** each, *a sufficient quantity.*

Transfer 10 Cc. of Fluidextract of Belladonna Root by means of a graduated pipette to a separator, add 10 Cc. of distilled water, 20 Cc. of chloroform, and 2 Cc. of ammonia water. Shake the separator well for one minute, and draw off the lower chloroformic layer into a second separator. Repeat the extraction with two portions of 10 Cc. each of chloroform, and draw the chloroformic solution into the second separator. To the latter add 8 Cc. of normal sulphuric acid V.S. and 20 Cc. of distilled water, shaking well for one minute. When perfectly separated draw off and reject the lower chloroformic layer, and filter the acid aqueous layer into a clean separator. Wash the separator and filter with 10 Cc. of distilled water, adding this to the clean separator. To the latter add 20 Cc. of chloroform and 4 Cc. of ammonia water, and shake well for several minutes. Draw off the lower chloroformic layer into a beaker, and repeat the extraction with two portions of 10 Cc. each of chloroform, adding the chloroformic solution to the beaker. Allow the chloroform in the beaker to evaporate on a water-bath, containing warm water, until the residue is perfectly dry. To the alkaloidal residue add 5 Cc. of tenth-normal sulphuric acid V.S., and when the residual alkaloids have all dissolved, titrate the solution with fiftieth-normal potassium hydroxide V.S., using 5 drops of cochineal or iodeosin T.S. as an indicator. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from 5 (the 5 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.0287, and this product by 10, to obtain the weight in grammes of mydriatic alkaloids contained in *one hundred cubic centimeters* of the Fluidextract of Belladonna Root.

Average dose.—0.05 Cc. (1 minim).

FLUIDEXTRACTUM BERBERIDIS

Fluidextract of Berberis

Berberis, in No. 60 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *four hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol until the Berberis is exhausted. Reserve the first *seven hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM BUCHU

Fluidextract of Buchu

[Extractum Buchu Fluidum, Pharm. 1890]

Buchu, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Buchu is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM CALAMI

Fluidextract of Calamus

[EXTRACTUM CALAMI FLUIDUM, PHARM. 1890]

Calamus, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator ; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Calamus is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract ; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM CALUMBÆ

Fluidextract of Calumba

[EXTRACTUM CALUMBÆ FLUIDUM, PHARM. 1890]

Calumba, in No. 20 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred cubic centimeters* of Alcohol with *three hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator ; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Calumba is exhausted. Reserve the first *seven hundred cubic centimeters* of the percolate. Distil off the Alcohol from the remainder by means of a water-bath, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM CANNABIS INDICÆ

Fluidextract of Indian Cannabis

[Extractum Cannabis Indicæ Fluidum, Pharm. 1890]

Indian Cannabis, in No. 30 powder, *one thousand grammes* .	**1000 Gm.**
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	**1000 Cc.**

Moisten the powder with *three hundred cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Indian Cannabis is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate. Distil off the Alcohol from the remainder by means of a water-bath, and evaporate the residue, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—0.05 Cc. (1 minim).

FLUIDEXTRACTUM CAPSICI

Fluidextract of Capsicum

[Extractum Capsici Fluidum, Pharm. 1890]

Capsicum, in No. 50 powder, *one thousand grammes*	**1000 Gm.**
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	**1000 Cc.**

Moisten the powder with *five hundred cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Capsicum is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.05 Cc. (1 minim).

FLUIDEXTRACTUM CHIMAPHILÆ

Fluidextract of Chimaphila

[EXTRACTUM CHIMAPHILÆ FLUIDUM, PHARM. 1890]

Chimaphila, in No. 30 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *four hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Chimaphila is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM CHIRATÆ

Fluidextract of Chirata

[EXTRACTUM CHIRATÆ FLUIDUM, PHARM. 1890]

Chirata, in No. 30 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred and fifty cubic centimeters* of Diluted Alcohol, pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Chirata is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 1 Cc. (15 minims).

FLUIDEXTRACTUM CIMICIFUGÆ

Fluidextract of Cimicifuga

[EXTRACTUM CIMICIFUGÆ FLUIDUM, PHARM. 1890]

Cimicifuga, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *two hundred and fifty cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Cimicifuga is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 1 Cc. (15 minims).

FLUIDEXTRACTUM CINCHONÆ

Fluidextract of Cinchona

[EXTRACTUM CINCHONÆ FLUIDUM, PHARM. 1890]

Cinchona, in No. 60 powder, *one thousand grammes*	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *eight hundred cubic centimeters* of Alcohol and *one hundred cubic centimeters* of Water. Moisten the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator, and pour on the remainder of the menstruum. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, and, when the liquid in the percolator has disappeared from the surface, gradually pour on a mixture of Alcohol and Water, made in the proportion of *eight hundred cubic centimeters* of Alcohol to *two hundred cubic centimeters* of Water, and continue the percolation slowly until the Cinchona is exhausted. Reserve the first *seven hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of anhydrous ether-soluble alkaloids in the remainder of the liquid, and add to this enough of a mixture of Alcohol and Water, using the same proportions as before, to make each *one hundred cubic centimeters* of the Fluidextract contain 4 Gm. of anhydrous ether-soluble alkaloids from Cinchona.

Assay of Fluidextract of Cinchona

Fluidextract of Cinchona, *ten cubic centimeters* . . . . . . 10 Cc.
Ether, sp. gr. not above 0.720 at 25° C. (77° F.),
Normal Sulphuric Acid V.S.,
Ammonia Water,
Chloroform, each, *a sufficient quantity*.

Transfer 10 Cc. of Fluidextract of Cinchona by means of a graduated pipette to an Erlenmeyer flask of 200 Cc. capacity, and add a mixture of 100 Cc. of ether, 25 Cc. of chloroform, and 10 Cc. of ammonia water. Insert the stopper securely, and shake the flask vigorously, at intervals, during ten minutes. Allow the liquids to separate, decant into a measuring cylinder exactly 66 Cc. of the supernatant liquid (representing 5 Cc. of the Fluidextract), and transfer this to a separator, rinsing the cylinder with 5 Cc. of ether and adding this to the separator. Add to the latter about 10 Cc. of normal sulphuric acid V.S., or enough to make the solution distinctly acid, and shake the separator vigorously for several minutes, and when the liquids have completely separated, draw off the lower layer into a second separator. To the first separator add 5 Cc. more of normal sulphuric acid V.S., and 5 Cc. of distilled water, shake it for several minutes, and when the liquids have separated, draw off the lower layer into the second separator. Now add 5 Cc. of distilled water to the first separator, shake it, separate as before, and then draw off the lower aqueous layer into the second separator. To the second separator, add 25 Cc. of ether, a small piece of red litmus paper, and then, gradually, ammonia water, keeping the temperature of the liquids below 25° C. (77° F.), until the reaction is alkaline. Then shake the separator vigorously for two minutes, and allow the liquids to stand for ten minutes at a temperature below 15° C. (59° F.). Draw off and reject the lower aqueous layer, and then transfer the ether-layer into a tared beaker. Add 5 Cc. more of ether to the separator, rinse carefully, and add the rinsings to the tared beaker, and entirely evaporate the ether at a moderate heat on a water-bath. Then dry the beaker in an air-bath at 110° C. (230° F.) for half an hour, cool, and weigh. Replace the beaker in the air-bath, and heat again at the same temperature for half an hour, cool, and weigh, repeating until the weight is constant. Multiply the weight of the residue by 20, to obtain the weight in grammes of anhydrous ether-soluble alkaloids contained in *one hundred cubic centimeters* of the Fluidextract of Cinchona.

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM COCÆ

Fluidextract of Coca

[EXTRACTUM COCÆ FLUIDUM, PHARM. 1890]

Coca, in No. 40 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *four hundred and fifty cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Coca is exhausted. Reserve the first *seven hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of ether-soluble alkaloids in the remainder of the liquid, and add to this enough Diluted Alcohol to make each *one hundred cubic centimeters* of the Fluidextract contain 0.5 Gm. of ether-soluble alkaloids from Coca.

Assay of Fluidextract of Coca

Fluidextract of Coca, *ten cubic centimeters*	10 Cc.
Ammonia Water,	
Ether,	
Distilled Water,	
Normal Sulphuric Acid V.S.,	
Tenth-normal Sulphuric Acid V.S.,	
Fiftieth-normal Potassium Hydroxide V.S.,	
Cochineal T.S. or **Iodeosin T.S.,** each, *a sufficient quantity.*	

Transfer 10 Cc. of Fluidextract of Coca by means of a graduated pipette to a separator, add 25 Cc. of ether, and then 2 Cc. of ammonia water, shaking together for one minute. When the liquids have completely separated, draw off the lower aqueous layer into a second separator, and to this add 20 Cc. more of ether, and repeat the shaking for one minute. Draw off and reject the lower aqueous layer from the second separator, and add the ether-layer to the first separator. To this separator now add 5 Cc. of normal sulphuric acid V.S. and

5 Cc. of distilled water, and shake it well for one or two minutes. After the liquids have separated, draw off the lower aqueous layer into the other separator, and repeat the extraction in the first separator with 9 Cc. of distilled water and 1 Cc. of normal sulphuric acid V.S., shaking the liquids for one minute, and separating as before. Add the aqueous solution to the other separator, and reject the ether. Now add to the combined acid liquids 20 Cc. of ether, a small piece of red litmus paper, and sufficient ammonia water to render the mixture distinctly alkaline, and shake the liquids for one or two minutes. Draw off the separated aqueous layer into the other separator and the ether-layer into a beaker. Repeat the extraction of the aqueous layer in the other separator with two portions (15 Cc. each) of ether, and add the resulting ether-solutions to the beaker. Now evaporate the ether from the beaker, and, when dry, add to it 5 Cc. of tenth-normal sulphuric acid V.S., and stir until the alkaloidal residue is dissolved. Then add 5 drops of cochineal T.S. or iodeosin T.S., and titrate the excess of acid with fiftieth-normal potassium hydroxide V.S. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract this number from 5 (the 5 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.03, and this product by 10, to obtain the weight in grammes of ether-soluble alkaloids contained in *one hundred cubic centimeters* of the Fluidextract of Coca.

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM COLCHICI SEMINIS

Fluidextract of Colchicum Seed

[Extractum Colchici Seminis Fluidum, Pharm. 1890]

Colchicum Seed, in No. 50 powder, *one thousand grammes* . .	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *three hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Colchicum Seed is exhausted. Reserve the first *seven hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of colchicine in the remainder of the liquid, and add to this enough menstruum to make each *one hundred cubic centimeters* of the Fluidextract contain 0.4 Gm. of colchicine.

Assay of Fluidextract of Colchicum Seed

Fluidextract of Colchicum Seed, *ten cubic centimeters* . . .	10 Cc.
Ether,	
Chloroform,	
Alcohol,	
Ammonia Water,	
Distilled Water, each, *a sufficient quantity.*	

Measure into a separator 10 Cc. of Fluidextract of Colchicum Seed, add 1 Cc. of ammonia water, and shake out the alkaloid with three successive portions, 15, 15, and 10 Cc., of chloroform. Collect the chloroformic solutions in a beaker or dish, and evaporate it nearly to dryness by applying a very gentle heat. Dissolve the residue in 10 Cc. of ether, add 5 Cc. of water, stir well, and heat gently until the ether is evaporated. After cooling, filter the aqueous solution into a small separator, retaining the insoluble matter as much as possible in the beaker or dish. Redissolve the residue in a little ether, add 5 Cc. of water, and proceed as before. Wash the container and filter with a little water, and shake the aqueous solution well for one minute with 15 Cc. of chloroform. Draw off the chloroform, after perfect separation, into a tared flask, and again shake out the aqueous liquid, successively, with three portions of 10 Cc. each of chloroform, collecting these solutions in the tared flask. Evaporate the chloroform completely; dissolve the residue in a little alcohol, evaporate the latter, redissolve it in alcohol, evaporate the alcohol as before, and dry the residue at 100° C. (212° F.) until the weight, after cooling in a desiccator, remains constant. Multiply the weight of the residue by 10, to obtain the weight in grammes of colchicine contained in *one hundred cubic centimeters* of the Fluidextract of Colchicum Seed.

Average dose.—0.2 Cc. (3 minims).

FLUIDEXTRACTUM CONII

Fluidextract of Conium

[EXTRACTUM CONII FLUIDUM, PHARM. 1890]

Conium, in No. 40 powder, *one thousand grammes*	1000 Gm.
Acetic Acid, *twenty cubic centimeters*	20 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix the Acetic Acid with *nine hundred and eighty cubic centimeters* of Diluted Alcohol, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and then Diluted Alcohol, until the Conium is exhausted.

Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, in a porcelain dish, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of coniine in the remainder of the liquid, and add to this enough Diluted Alcohol to make each *one hundred cubic centimeters* of the Fluidextract contain 0.45 Gm. of coniine.

Assay of Fluidextract of Conium

Fluidextract of Conium, *ten cubic centimeters* . . . . 10 Cc.
Ether,
Alcohol,
Absolute Alcohol,
Ammonia Water,
Normal Sulphuric Acid V.S.,
Sodium Carbonate T.S.,
Hydrochloric Acid Solution (5 percent. HCl),
Distilled Water, each, *a sufficient quantity.*

Transfer 10 Cc. of Fluidextract of Conium by means of a graduated pipette to an evaporating dish containing a little clean sand, and evaporate it to dryness at a gentle heat. Mix the sand uniformly with the extract and transfer it to an Erlenmeyer flask of about 200 Cc. capacity, rinse the dish with 100 Cc. of a mixture of ether 100 Cc., alcohol 7 Cc., and ammonia water 3 Cc., added in portions, and transfer the rinsings to the flask. Insert the stopper securely and shake the flask at intervals during one hour. Decant 50 Cc. of the liquid (representing 5 Cc. of the Fluidextract of Conium) into a beaker, and add sufficient normal sulphuric acid V.S. to produce a distinctly acid reaction. Evaporate the ether at a gentle heat by the aid of a water-bath; then add 15 Cc. of absolute alcohol, and set the beaker aside in a cool place for two hours to allow the ammonium sulphate to deposit. Filter the liquid; wash the residue and filter with a little absolute alcohol, and add the washings to the filtrate; neutralize any excessive amount of acid with sodium carbonate T.S., being careful to retain a slight acidity. Concentrate the liquid to 3 Cc. by the aid of a gentle heat on a water-bath, add 3 Cc. of distilled water and 2 drops of normal sulphuric acid V.S. Add 15 Cc. of ether to remove traces of fatty matter, pour off the ether-solution, and repeat the washing. Then transfer the acid liquid to a separator, introduce a small piece of red litmus paper, and add sufficient sodium carbonate T.S. to render the liquid slightly alkaline; then shake out with successive portions of 15, 10, and 10 Cc. of ether. To the combined ether-solutions in a tared beaker add, drop by drop, sufficient hydrochloric acid solution (5 percent.) to insure an excess of acid, and then evaporate the ether by a gentle heat on a water-bath. Remove the excess of hydrochloric acid by adding to the residue 3 Cc. of alcohol and heating gently to evaporate the liquid, repeat this operation once, and dry the residue at a temperature not exceeding 60° C. (140° F.) until the weight, after cooling in a desiccator, remains constant. Multiply the weight of the residue by 0.777, and the product by 20, to obtain the weight in grammes of coniine contained in *one hundred cubic centimeters* of the Fluidextract of Conium.

Average dose.—0.2 Cc. (3 minims).

FLUIDEXTRACTUM CONVALLARIÆ

Fluidextract of Convallaria

[EXTRACTUM CONVALLARIÆ FLUIDUM, PHARM. 1890]

Convallaria, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred and fifty cubic centimeters* of Alcohol with *three hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, until the Convallaria is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—0.5 Cc. (8 minims).

FLUIDEXTRACTUM CUBEBÆ

Fluidextract of Cubeb

[EXTRACTUM CUBEBÆ FLUIDUM, PHARM. 1890]

Cubeb, in No. 40 powder, *one thousand grammes*	1000 Gm
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *two hundred cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Cubeb is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM CYPRIPEDII

Fluidextract of Cypripedium

[EXTRACTUM CYPRIPEDII FLUIDUM, PHARM. 1890]

Cypripedium, in No. 60 powder, *one thousand grammes* . . .	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred and fifty cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator: then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Cypripedium is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM DIGITALIS

Fluidextract of Digitalis

[EXTRACTUM DIGITALIS FLUIDUM, PHARM. 1890]

Digitalis in No. 60 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *four hundred cubic centimeters* of Diluted Alcohol, pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Digitalis is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—0.05 Cc. (1 minim).

FLUIDEXTRACTUM ERGOTÆ

Fluidextract of Ergot

[EXTRACTUM ERGOTÆ FLUIDUM, PHARM. 1890]

Ergot, recently ground and in No. 60 powder, *one thousand grammes*	1000 Gm.
Acetic Acid, *twenty cubic centimeters*	20 Cc.
Diluted Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Acetic Acid with *nine hundred and eighty cubic centimeters* of Diluted Alcohol, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and then Diluted Alcohol, until the Ergot is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, in a porcelain dish, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM ERIODICTYI

Fluidextract of Eriodictyon

[EXTRACTUM ERIODICTYI FLUIDUM, PHARM. 1890]

Eriodictyon, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Eriodictyon is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM EUCALYPTI

Fluidextract of Eucalyptus

[EXTRACTUM EUCALYPTI FLUIDUM, PHARM. 1890]

Eucalyptus, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol, **Water**, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Eucalyptus is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM EUONYMI

Fluidextract of Euonymus

Euonymus, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol, **Water**, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *three* *hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough of the menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Euonymus is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.5 Cc. (8 minims).

FLUIDEXTRACTUM EUPATORII

Fluidextract of Eupatorium

[EXTRACTUM EUPATORII FLUIDUM, PHARM. 1890]

Eupatorium, in No. 40 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *four hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Eupatorium is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM FRANGULÆ

Fluidextract of Frangula

[EXTRACTUM FRANGULÆ FLUIDUM, PHARM. 1890]

Frangula, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *five hundred cubic centimeters* of Alcohol with *eight hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator ; then add enough of the menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Frangula is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract ; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 1 Cc. (15 minims).

FLUIDEXTRACTUM GELSEMII

Fluidextract of Gelsemium

[EXTRACTUM GELSEMII FLUIDUM, PHARM. 1890]

Gelsemium, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator ; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Gelsemium is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract ; dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.05 Cc. (1 minim).

FLUIDEXTRACTUM GENTIANÆ

Fluidextract of Gentian

[EXTRACTUM GENTIANÆ FLUIDUM, PHARM. 1890]

Gentian, in No. 30 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred and fifty cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Gentian is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM GERANII

Fluidextract of Geranium

[EXTRACTUM GERANII FLUIDUM, PHARM. 1890]

Geranium, in No. 30 powder, *one thousand grammes*	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Glycerin with *six hundred cubic centimeters* of Alcohol, and *three hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough of the menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards a mixture of Alcohol and Water, made in the proportion of *six hundred cubic centimeters* of Alcohol to *four hundred cubic centimeters* of Water, until the Geranium is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM GLYCYRRHIZÆ

Fluidextract of Glycyrrhiza

[EXTRACTUM GLYCYRRHIZÆ FLUIDUM. PHARM. 1890]

Glycyrrhiza, in No. 30 powder, *one thousand grammes*	1000 Gm.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Ammonia Water, *fifty cubic centimeters*	50 Cc.
Alcohol, Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Pour *four hundred cubic centimeters* of boiling Water upon the Glycyrrhiza, contained in a suitable vessel, and allow it to stand for one hour. Pack the moistened powder loosely in a metallic percolator, pour boiling Water upon it, and allow the percolation to proceed, supplying boiling Water until the Glycyrrhiza is exhausted. Evaporate the percolate at a moderate heat, until it measures *four hundred and fifty cubic centimeters*, and, when cool, add *four hundred and fifty cubic centimeters* of Alcohol, mix well and set it aside for three days. After filtering the liquid, distil it until *five hundred cubic centimeters* of distillate have been obtained: transfer the liquid in the still to a suitable container, add the Glycerin, Ammonia Water, and *two hundred cubic centimeters* of Alcohol. Finally, add sufficient Water to make the Fluidextract measure *one thousand cubic centimeters*.

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM GRANATI

Fluidextract of Pomegranate

Pomegranate, in No. 30 Powder, *one thousand grammes* . . .	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *nine hundred cubic centimeters* of Diluted Alcohol, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards Diluted Alcohol, until the Pomegranate is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM GRINDELIÆ

Fluidextract of Grindelia

[EXTRACTUM GRINDELIÆ FLUIDUM, PHARM. 1890]

Grindelia, in No. 30 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, until the Grindelia is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate. Distil off the Alcohol from the remainder by means of a water-bath, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM GUARANÆ

Fluidextract of Guarana

[EXTRACTUM GUARANÆ FLUIDUM, PHARM. 1890]

Guarana, in No. 60 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *two hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Guarana is exhausted. Reserve the first *seven hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *five cubic centimeters* of this liquid by the process given below: from the results thus obtained, ascertain by calculation the amount of alkaloids contained in the remainder of the liquid; add to this enough Diluted Alcohol to make each *one hundred cubic centimeters* of the finished Fluidextract contain 3.5 Gm. of the alkaloids from Guarana.

Assay of Fluidextract of Guarana

Fluidextract of Guarana, *five cubic centimeters*	5 Cc.
Chloroform,	
Ether,	
Ammonia Water,	
Normal Sulphuric Acid V.S.,	
Distilled Water, each, *a sufficient quantity.*	

Transfer to a separator 5 Cc. of Fluidextract of Guarana, add 15 Cc. of chloroform and 1 Cc. of ammonia water. Shake well and allow the liquid to separate completely. Draw off the chloroform into a beaker. Shake out the fluid remaining in the separator with two additional portions of chloroform of 10 Cc. each, evaporate the combined chloroformic solutions carefully to dryness. Dissolve the alkaloidal residue in a mixture of 2 Cc. of normal sulphuric acid V.S. and 20 Cc. of warm distilled water. Allow it to cool, and filter the solution into a separator, rinse the flask and filter with distilled water, adding the rinsings to the separator, then add 20 Cc. of chloroform and 2 Cc. of ammonia water and shake the separator for one minute. Draw off the chloroform into a tared flask, and repeat the extraction with two portions of 10 Cc. each of chloroform, adding this to the tared flask. Distil off the chloroform, and, when dry, add 2 Cc. of ether, and evaporate this very carefully with the aid of a water-bath (to avoid decrepitation). Dry the residue to a constant weight on the water-bath. Multiply the weight by 20, which will give the weight in grammes of alkaloids contained in *one hundred cubic centimeters* of Fluidextract of Guarana.

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM HAMAMELIDIS FOLIORUM

Fluidextract of Hamamelis Leaves

[Extractum Hamamelidis Fluidum, Pharm. 1890]

Hamamelis Leaves, in No. 40 powder, *one thousand grammes*	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *three hundred cubic centimeters* of Alcohol and *six hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a conical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and then a mixture of Alcohol and Water, made in the proportion of *three hundred cubic centimeters* of Alcohol to *six hundred cubic centimeters* of Water, until the Hamamelis Leaves are exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM HYDRASTIS

Fluidextract of Hydrastis

[EXTRACTUM HYDRASTIS FLUIDUM, PHARM. 1890]

Hydrastis, in No. 60 powder, *one thousand grammes*	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *six hundred cubic centimeters* of Alcohol and *three hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and then a mixture of Alcohol and Water, made in the proportion of *six hundred cubic centimeters* of Alcohol to *three hundred cubic centimeters* of Water, until the Hydrastis is exhausted. Reserve the first *seven hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of hydrastine in the remainder of the liquid: add to this enough menstruum to make each *one hundred cubic centimeters* of the finished Fluidextract contain 2 Gm. of hydrastine.

Assay of Fluidextract of Hydrastis

Fluidextract of Hydrastis, *ten cubic centimeters*	10 Cc.
Distilled Water,	
Potassium Iodide,	
Ammonia Water,	
Ether, each, *a sufficient quantity.*	

Transfer 10 Cc. of Fluidextract of Hydrastis by means of a graduated pipette to a 100 Cc. measuring flask, add 55 Cc. of distilled water in which 2 Gm. of potassium iodide have been previously dissolved, and sufficient water to make 100 Cc., and shake the liquid for several minutes. Then filter 50 Cc. of the liquid into a measuring cylinder and transfer it to a separator. Render the liquid alkaline with ammonia water, add 30 Cc. of ether, and shake the separator at intervals during several minutes. When separated, draw off the aqueous layer into a beaker, and the ether-solution into a tared beaker. Return the aqueous solution to the separator, and shake it with 20 Cc. more of ether for one minute. Draw off and reject the aqueous layer, and run the ether-solution into the tared beaker. Allow the combined ether-solutions to evaporate at a gentle heat, and dry the residue in the beaker to a constant weight on a water-bath. Multiply the weight by 20, which will give the weight in grammes of hydrastine contained in *one hundred cubic centimeters* of Fluidextract of Hydrastis.

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM HYOSCYAMI

Fluidextract of Hyoscyamus

[EXTRACTUM HYOSCYAMI FLUIDUM, PHARM. 1890]

Hyoscyamus, in No. 60 powder, *one thousand grammes* . . .	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *three hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Hyoscyamus is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *fifty cubic centimeters* of this liquid, as directed below; from the results thus obtained, ascertain by calculation the amount of the alkaloids in the remainder of the liquid; add to this enough menstruum to make each *one hundred cubic centimeters* of the finished Fluidextract contain 0.075 Gm. of the alkaloids from Hyoscyamus.

Assay of Fluidextract of Hyoscyamus

The method to be employed is identical with that given on page 168, using *fifty cubic centimeters* of Fluidextract of Hyoscyamus, instead of the quantity of Fluidextract of Belladonna Root there directed, and multiplying the product by 2 instead of 10.

Average dose.— 0.2 Cc. (3 minims).

FLUIDEXTRACTUM IPECACUANHÆ

Fluidextract of Ipecac

[EXTRACTUM IPECACUANHÆ FLUIDUM, PHARM. 1890]

Ipecac, in No. 80 powder, *one thousand grammes*	**1000 Gm.**
Alcohol,	
Water, each, *a sufficient quantity*,	
To make about *one thousand cubic centimeters* . .	**1000 Cc.**

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Ipecac is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50°C. (122° F.), to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of the alkaloids in the remainder of the liquid; add to this enough menstruum to make each *one hundred cubic centimeters* of the finished Fluidextract contain 1.5 Gm. of the alkaloids from Ipecac.

Assay of Fluidextract of Ipecac

Fluidextract of Ipecac, *ten cubic centimeters*	10 Cc.
Ammonia Water,	
Ether,	
Normal Sulphuric Acid V.S.,	
Tenth-normal Sulphuric Acid V.S.,	
Fiftieth-normal Potassium Hydroxide V.S.,	
Cochineal T.S., each, *a sufficient quantity.*	

Transfer 10 Cc. of Fluidextract of Ipecac by means of a graduated pipette to a porcelain evaporating dish. Evaporate off the alcohol with the aid of a water-bath, and, when almost cool, add 5 Cc. of normal sulphuric acid V.S. and 20 Cc. of distilled water, and stir the liquid at intervals for three minutes. Filter the liquid into a separator, rinse the dish, and wash the filter successively with 10 Cc. and 5 Cc. of distilled water, and add these liquids to the separator. To the separator add 20 Cc. of ether and a small piece of red litmus paper; render the liquid alkaline with ammonia water and shake the separator for one minute. Draw off the aqueous layer into a beaker, and the ether-layer into another beaker. Return the aqueous solution to the separator, add 10 Cc. more of ether, and shake the liquid, adding the ether-solution to that already in the beaker, and returning the aqueous solution to the separator; repeat the extraction with 10 Cc. more of ether, and then add the ether-layer to that already in the beaker. Allow the combined ether-solutions to evaporate, either spontaneously or with the aid of a water-bath containing warm water, and then add 10 Cc. of tenth-normal sulphuric acid V.S. Stir the liquid carefully with a glass rod to facilitate the solution of the alkaloids, and when these have all dissolved, add 5 drops of cochineal T.S. From a graduated burette, add sufficient fiftieth-normal potassium hydroxide V.S. until a pink color is produced. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from 10 (the 10 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.0238, and this product by 10, which will give the weight in grammes of alkaloids contained in each *one hundred cubic centimeters* of Fluidextract of Ipecac.

Average dose.— { Emetic, 1 Cc. (15 minims).
Expectorant, 0.05 Cc. (1 minim).

FLUIDEXTRACTUM KRAMERIÆ

Fluidextract of Krameria

[EXTRACTUM KRAMERIÆ FLUIDUM, PHARM. 1890]

Krameria, in No. 40 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . . .	1000 Cc.

Moisten the powder with *four hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical glass percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Krameria is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM LAPPÆ

Fluidextract of Lappa

[EXTRACTUM LAPPÆ FLUIDUM, PHARM. 1890]

Lappa, in No. 60 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *four hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Lappa is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM LEPTANDRÆ

Fluidextract of Leptandra

[EXTRACTUM LEPTANDRÆ FLUIDUM, PHARM. 1890]

Leptandra, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it moderately in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Leptandra is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 1 Cc. (15 minims).

FLUIDEXTRACTUM LOBELIÆ

Fluidextract of Lobelia

Lobelia, in No. 50 powder, *one thousand grammes*	1000 Gm.
Acetic Acid,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *two hundred and seventy-five cubic centimeters* of Acetic Acid with *seven hundred and twenty-five cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical glass percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Acetic Acid and Water as before, until the Lobelia is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.5 Cc. (8 minims).

FLUIDEXTRACTUM LUPULINI

Fluidextract of Lupulin

[EXTRACTUM LUPULINI FLUIDUM, PHARM. 1890]

Lupulin, *one thousand grammes*	1000 Gm.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Pack the Lupulin firmly in a cylindrical percolator; then add enough Alcohol to saturate the Lupulin and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Lupulin is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.5 Cc. (8 minims).

FLUIDEXTRACTUM MATICO

Fluidextract of Matico

[EXTRACTUM MATICO FLUIDUM, PHARM. 1890]

Matico, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Matico is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 4 Cc. (1 fluidrachm).

FLUIDEXTRACTUM MEZEREI

Fluidextract of Mezereum

[EXTRACTUM MEZEREI FLUIDUM, PHARM. 1890]

Mezereum, in No. 30 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Mezereum is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate. Distil off the Alcohol from the remainder by means of a water-bath, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

FLUIDEXTRACTUM NUCIS VOMICÆ

Fluidextract of Nux Vomica

[EXTRACTUM NUCIS VOMICÆ FLUIDUM, PHARM. 1890]

Nux Vomica, in No. 40 powder, *one thousand grammes* . . .	**1000 Gm.**
Acetic Acid, *fifty cubic centimeters*	**50 Cc.**
Alcohol,	
Water, each, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	**1000 Cc.**

Mix Alcohol and Water in the proportion of *seven hundred and fifty cubic centimeters* of Alcohol and *two hundred and fifty cubic centimeters* of Water. Moisten the powder with *one thousand cubic centimeters* of the mixture, to which the Acetic Acid had previously been added, and let it digest, in a well-covered vessel, in a warm place, during forty-eight hours. Then pack it in a cylindrical glass percolator, gradually pour menstruum upon it, and allow the percolation to proceed slowly until the Nux Vomica is practically exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, distil off the Alcohol from the remainder by means of a water-bath, and evaporate the residue, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of strychnine in the remainder of the liquid; add to this enough menstruum to make each *one hundred cubic centimeters* of the finished Fluidextract contain 1 Gm. of strychnine.

Assay of Fluidextract of Nux Vomica

Fluidextract of Nux Vomica, *ten cubic centimeters* . . . . . 10 Cc.
Ammonia Water,
Ether,
Chloroform,
Distilled Water,
Normal Sulphuric Acid V.S.,
Sulphuric Acid Solution (3 percent. H_2SO_4),
Sodium Hydroxide Solution (1 in 10),
Nitric Acid (sp. gr. 1.42),
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Iodeosin T.S., each, *a sufficient quantity.*

Transfer 10 Cc. of Fluidextract of Nux Vomica by means of a graduated pipette to a porcelain dish, evaporate it to dryness with the aid of a water-bath, and dissolve the residue, while warm, in a mixture of 16 Cc. of ether, 5 Cc. of chloroform, and 4 Cc. of ammonia water, and transfer the solution to a separator, rinsing the dish with a little chloroform, which is to be added to the separator, and shake the separator carefully for a few minutes. When the fluids have separated, draw off the aqueous layer into another separator, wash the chloroform-ether liquid and separator with a little water, and add this to the second separator. Then shake the aqueous liquid with two successive portions of 15 and 10 Cc., respectively, of chloroform, and add these to the first separator. If a small portion of the liquid left in the second separator still shows, after acidifying, a reaction with mercuric potassium iodide T.S., repeat the shaking out with 10 Cc. more of chloroform. Now shake the combined liquids in the first separator with three successive portions, respectively, of 15, 10, and 10 Cc. of normal sulphuric acid V.S., and collect the combined acid solutions in another separator. To this acid solution add a small piece of red litmus paper, and sufficient ammonia water to render it alkaline, then shake out successively with three portions, respectively, of 25, 10, and 10 Cc. of chloroform, and collect the chloroform solutions in a beaker. Evaporate the chloroform with the aid of a water-bath, dissolve the alkaloidal residue in 15 Cc. of 3 percent. sulphuric acid solution, by the aid of a water-bath, and allow the liquid to cool. To this solution add 3 Cc. of a cooled mixture of equal volumes of nitric acid (specific gravity 1.42) and distilled water, and, after rotating the liquid a few times, set it aside for exactly ten minutes, stirring it gently three times during this interval. Transfer the resulting red liquid to a separator containing 25 Cc. of an aqueous solution of sodium hydroxide (1 in 10), wash the beaker three times with very small amounts of distilled water, and add the washings to the separator. If the liquid is not quite turbid, add 2 Cc. more of the solution of sodium hydroxide. Now add 20 Cc. of chloroform to the separator, and shake it well by a rotating motion for a few minutes, allow the liquids to separate, and draw off the chloroform through a small filter, wetted with chloroform, into a flask. Repeat this twice, using 10 Cc. of chloroform each time, and draw off both portions into the flask, using the same filter. Finally, wash the filter and funnel with 5 Cc. of chloroform, and then evaporate all the chloroform by means of a water-bath, very carefully, to avoid decrepitation. To the alkaloidal residue, add 10 Cc. of tenth-normal sulphuric acid V.S., 5 drops of iodeosin T.S., about 80 Cc. of distilled water, and 20 Cc. of ether. When all the alkaloid is dissolved, titrate the excess of acid with fiftieth-normal potassium hydroxide V.S., until the aqueous liquid just turns pink. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. taken, by 5, subtract this number from 10 (the 10 Cc. of tenth-normal sulphuric acid V.S. taken), multiply the remainder by 0.0332, and this product by 10, which will give the weight in grammes of strychnine contained in *one hundred* [illegible] of the Fluidextract of Nux Vomica.

Average dose.—0.05 Cc. (1 minim).

FLUIDEXTRACTUM PAREIRÆ

Fluidextract of Pareira

[EXTRACTUM PAREIRÆ FLUIDUM, PHARM. 1890]

Pareira, in No. 40 powder, *one thousand grammes*	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol,	
Water, each, a sufficient quantity,	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Glycerin with *one hundred and ninety cubic centimeters* of Alcohol and *three hundred* [illegible] *cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards a mixture of Alcohol and Water, made in the proportion of *one hundred and ninety cubic centimeters* of Alcohol to *four hundred* [illegible] of Water, until the Pareira is exhausted. Reserve the first [illegible] *cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters*.

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM PHYTOLACCÆ

Fluidextract of Phytolacca

[EXTRACTUM PHYTOLACCÆ RADICIS FLUIDUM, PHARM. 1890]

Phytolacca, in No. 40 powder, [illegible]	1000 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make [illegible]	1000 Cc.

Moisten the powder with *four hundred* [illegible] of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Phytolacca is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— { Emetic, 1 Cc. (15 minims).
Alterative, 0.1 Cc. (1½ minims).

FLUIDEXTRACTUM PILOCARPI

Fluidextract of Pilocarpus

[EXTRACTUM PILOCARPI FLUIDUM, PHARM. 1890]

Pilocarpus, in No. 40 powder, *one thousand grammes*	**1000 Gm.**
Diluted Alcohol, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	**1000 Cc.**

Moisten the powder with *three hundred and fifty cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Pilocarpus is exhausted. Reserve the first *seven hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid by the process given below; from the results thus obtained, ascertain by calculation the amount of alkaloids in the remainder of the liquid; add to this enough menstruum to make each *one hundred cubic centimeters* of Fluidextract contain 0.4 Gm. of the alkaloids from Pilocarpus.

Assay of Fluidextract of Pilocarpus

Fluidextract of Pilocarpus, *ten cubic centimeters*	**10 Cc.**
Chloroform,	
Ammonia Water,	
Normal Sulphuric Acid V.S.,	
Tenth-normal Sulphuric Acid V.S.,	
Fiftieth-normal Potassium Hydroxide V.S.,	
Cochineal T.S. or **Iodeosin T.S.**, each, *a sufficient quantity.*	

Transfer 10 Cc. of Fluidextract of Pilocarpus by means of a graduated pipette to a porcelain dish containing a little clean sand, and evaporate it to dryness with the aid of a water-bath. Mix the sand uniformly with the extract and transfer

the mixture to an Erlenmeyer flask of about 100 Cc. capacity, rinsing the dish with a mixture of 25 Cc. of chloroform and 2.5 Cc. of ammonia water. Transfer the rinsings to the flask, cork it securely, and shake it well at intervals during one hour. Decant the liquid, transfer to a separator, wash the sand with several portions of chloroform, draw off and filter the chloroformic liquid into another separator. Then shake out the chloroform solution with 15 Cc. of normal sulphuric acid V.S., transferring the acid aqueous solution to another separator. Repeat the shaking out with a mixture of 5 Cc. of normal sulphuric acid V.S. and 5 Cc. of distilled water, collecting the acid solutions in the second separator. Again repeat the shaking out with 10 Cc. of distilled water, and add the aqueous liquid to the second separator. Introduce into the second separator a small piece of red litmus paper, add enough ammonia water to render the liquid alkaline, and shake out the liquid with 20 Cc. of chloroform, drawing off the chloroformic solution into a beaker. Repeat the shaking out with two portions of 15 and 10 Cc. each of chloroform, and add the chloroformic solutions to the beaker. Evaporate the chloroform by means of a water-bath, and dissolve the alkaloidal residue in 8 Cc. of tenth-normal sulphuric acid V.S. Add 5 drops of cochineal T.S. or iodeosin T.S., and titrate the excess of acid with fiftieth-normal potassium hydroxide V.S. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from 8 (the 8 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.02, and this product by 10, to obtain the weight in grammes of alkaloids contained in *one hundred cubic centimeters* of the Fluidextract of Pilocarpus.

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM PODOPHYLLI

Fluidextract of Podophyllum

[EXTRACTUM PODOPHYLLI FLUIDUM. PHARM. 1890]

Podophyllum, in No. 40 powder, *one thousand grammes* . . .	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Podophyllum is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate. Distil off the Alcohol from the remainder by means of a water-bath, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—0.5 Cc. (8 minims).

FLUIDEXTRACTUM PRUNI VIRGINIANÆ

Fluidextract of Wild Cherry

[EXTRACTUM PRUNI VIRGINIANÆ FLUIDUM, PHARM. 1890]

Wild Cherry, in No. 30 powder, *one thousand grammes*	1000 Gm.
Glycerin, *two hundred cubic centimeters*	200 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *two hundred cubic centimeters* of Alcohol and *six hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical glass percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours; then allow the percolation to proceed, gradually adding, first, the remainder of the menstruum, and afterwards a mixture of Alcohol and Water, made in the proportion of *two hundred cubic centimeters* of Alcohol to *eight hundred cubic centimeters* of Water, and allow the percolation to proceed very slowly, until the Fluidextract measures *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM QUASSIÆ

Fluidextract of Quassia

[EXTRACTUM QUASSIÆ FLUIDUM, PHARM. 1890]

Quassia, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *three hundred cubic centimeters* of Alcohol with *six hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Quassia is exhausted.

Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.5 Cc. (8 minims).

FLUIDEXTRACTUM QUERCUS

Fluidextract of Quercus

Quercus, in No. 40 powder, *one thousand grammes*	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *nine hundred cubic centimeters* of Diluted Alcohol, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards Diluted Alcohol, until the Quercus is exhausted. Reserve the first *seven hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 1 Cc. (15 minims).

FLUIDEXTRACTUM QUILLAJÆ

Fluidextract of Quillaja

Quillaja, in No. 40 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *four hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Quillaja is exhausted.

Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.2 Cc. (3 minims).

FLUIDEXTRACTUM RHAMNI PURSHIANÆ

Fluidextract of Cascara Sagrada

[EXTRACTUM RHAMNI PURSHIANÆ FLUIDUM, PHARM. 1890]

Cascara Sagrada, in No. 40 powder, *one thousand grammes* . .	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *four hundred cubic centimeters* of Alcohol with *six hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, until the Cascara Sagrada is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 1 Cc. (15 minims).

FLUIDEXTRACTUM RHAMNI PURSHIANÆ AROMATICUM

Aromatic Fluidextract of Cascara Sagrada

Cascara Sagrada, in No. 40 powder, *one thousand grammes* .	1000 Gm.
Glycyrrhiza, in No. 30 powder, *one hundred grammes*	100 Gm.
Magnesium Oxide, *one hundred and twenty-five grammes* . . .	125 Gm.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Compound Spirit of Orange, *ten cubic centimeters*	10 Cc.
Alcohol,	
Diluted Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Cascara Sagrada, Glycyrrhiza, and Magnesium Oxide thoroughly, and, having added *two thousand cubic centimeters* of Water, allow the mixture to macerate for twelve hours, and then dry it at a gentle heat. Mix the Glycerin with *five hundred cubic centimeters* of Alcohol and *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards Diluted Alcohol, until the powder is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, add the Compound Spirit of Orange and enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM RHEI

Fluidextract of Rhubarb

[EXTRACTUM RHEI FLUIDUM, PHARM. 1890]

Rhubarb, in No. 30 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a conical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Rhubarb is exhausted. Reserve the first *seven hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 70° C. (158° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM RHOIS GLABRÆ

Fluidextract of Rhus Glabra

[EXTRACTUM RHOIS GLABRÆ FLUIDUM, PHARM. 1890]

Rhus Glabra, in No. 40 powder, *one thousand grammes* . . .	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *nine hundred cubic centimeters* of Diluted Alcohol, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards Diluted Alcohol, until the Rhus Glabra is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 1 Cc. (15 minims).

FLUIDEXTRACTUM ROSÆ

Fluidextract of Rose

[EXTRACTUM ROSÆ FLUIDUM, PHARM. 1890]

Red Rose, in No. 20 powder, *one thousand grammes*	1000 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *nine hundred cubic centimeters* of Diluted Alcohol, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it moderately in a cylindrical glass percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards Diluted Alcohol, until the Red Rose is exhausted. Reserve the first *seven hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, in a porcelain dish, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM RUBI

Fluidextract of Rubus

[EXTRACTUM RUBI FLUIDUM, PHARM. 1890]

Rubus, in No. 40 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred and fifty cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Rubus is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate. Distil off the Alcohol from the remainder by means of a water-bath, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM SABINÆ

Fluidextract of Savin

[EXTRACTUM SABINÆ FLUIDUM, PHARM. 1890]

Savin, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *two hundred and fifty cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Savin is exhausted. Reserve the first *nine* *hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.3 Cc. (5 minims).

FLUIDEXTRACTUM SANGUINARIÆ

Fluidextract of Sanguinaria

Sanguinaria, in No. 30 powder, *one thousand grammes*	1000 Gm.
Acetic Acid,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *two hundred and seventy-five cubic centimeters* of Acetic Acid with *seven hundred and twenty-five cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, allow it to macerate, in a well-covered vessel, during forty-eight hours. Then pack it firmly in a cylindrical glass percolator, gradually pour menstruum upon it, using the same proportions of Acetic Acid and Water as before, and allow the percolation to proceed slowly, until the Sanguinaria is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.1 Cc. (1½ minims).

FLUIDEXTRACTUM SARSAPARILLÆ

Fluidextract of Sarsaparilla

[EXTRACTUM SARSAPARILLÆ FLUIDUM, PHARM. 1890]

Sarsaparilla, in No. 30 powder, *one thousand grammes*	1000 Gm
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *three hundred cubic centimeters* of Alcohol with *six hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Sarsaparilla is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM SARSAPARILLÆ COMPOSITUM

Compound Fluidextract of Sarsaparilla

[EXTRACTUM SARSAPARILLÆ FLUIDUM COMPOSITUM, PHARM. 1890]

Sarsaparilla, in No. 30 powder, *seven hundred and fifty grammes*	750 Gm.
Glycyrrhiza, in No. 30 powder, *one hundred and twenty grammes*	120 Gm.
Sassafras, in No. 30 powder, *one hundred grammes*	100 Gm.
Mezereum, in No. 30 powder, *thirty grammes*	30 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *nine hundred cubic centimeters* of Diluted Alcohol, and, having moistened the mixed powders with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding first the remainder of the menstruum and then Diluted Alcohol, until the powder is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM SCILLÆ

Fluidextract of Squill

Squill, in No. 20 powder, *one thousand grammes*	1000 Gm.
Acetic Acid,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *two hundred and seventy-five cubic centimeters* of Acetic Acid with *seven hundred and twenty-five cubic centimeters* of Water, and, having added *eight hundred cubic centimeters* of the mixture to the powder, allow it to macerate, in a well-covered glass or porcelain vessel, during forty-eight hours, then transfer it to a conical glass percolator, and allow the percolation to proceed slowly, adding menstruum gradually, using the same proportions of Acetic Acid and Water as before, until the Fluidextract measures *one thousand cubic centimeters.*

Average dose.— 0.1 Cc. (1½ minims).

FLUIDEXTRACTUM SCOPOLÆ

Fluidextract of Scopola

Scopola, in No. 40 powder, *one thousand grammes*	**1000 Gm.**
Alcohol,	
Water, each, *a sufficient quantity*,	
To make about *one thousand cubic centimeters* . .	**1000 Cc.**

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Scopola is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid as directed below; from the results thus obtained, ascertain by calculation the amount of mydriatic alkaloids in the remainder of the liquid, and add to this enough menstruum to make each *one hundred cubic centimeters* of the finished Fluidextract contain 0.5 Gm. of the mydriatic alkaloids from Scopola.

Assay of Fluidextract of Scopola

The method to be employed is identical with that given for Fluidextract of Belladonna Root on page 168, using *ten cubic centimeters* of Fluidextract of Scopola.

Average dose.— 0.05 Cc. (1 minim).

FLUIDEXTRACTUM SCUTELLARIÆ

Fluidextract of Scutellaria

[EXTRACTUM SCUTELLARIÆ FLUIDUM, PHARM. 1890]

Scutellaria, in No. 40 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred and fifty cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Scutellaria is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM SENEGÆ

Fluidextract of Senega

[EXTRACTUM SENEGÆ FLUIDUM, PHARM. 1890]

Senega, in No. 40 powder, *one thousand grammes*	1000 Gm.
Solution of Potassium Hydroxide, *thirty cubic centimeters* .	30 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Solution of Potassium Hydroxide with *six hundred cubic centimeters* of Alcohol and *three hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical glass percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and then a mixture of Alcohol and Water, made in the proportion of *six hundred cubic centimeters* of Alcohol to *three hundred cubic centimeters* of Water, until the Senega is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, in a porcelain dish, to a soft extract; dissolve this in the reserved portion, and add enough of the last-mentioned mixture of Alcohol and Water to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM SENNÆ

Fluidextract of Senna

[EXTRACTUM SENNÆ FLUIDUM, PHARM. 1890]

Senna, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Diluted Alcohol, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred and fifty cubic centimeters* of Alcohol, pack it firmly in a cylindrical percolator, and percolate it with Alcohol until the Senna is exhausted. The alcoholic percolate thus obtained is to be rejected. Remove the powder from the percolator, dry it, and, having moistened it with *four hundred cubic centimeters* of Diluted Alcohol, pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Senna is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM SERPENTARIÆ

Fluidextract of Serpentaria

[EXTRACTUM SERPENTARIÆ FLUIDUM, PHARM. 1890]

Serpentaria, in No. 50 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Serpentaria is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

FLUIDEXTRACTUM SPIGELIÆ

Fluidextract of Spigelia

[EXTRACTUM SPIGELIÆ FLUIDUM, PHARM. 1890]

Spigelia, in No. 40 powder, *one thousand grammes*	**1000 Gm.**
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	**1000 Cc.**

Moisten the powder with *three hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Spigelia is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—4 Cc. (1 fluidrachm).

FLUIDEXTRACTUM STAPHISAGRIÆ

Fluidextract of Staphisagria

Staphisagria, in No. 40 powder, *one thousand grammes*	**1000 Gm.**
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	**1000 Cc.**

Mix *eight hundred cubic centimeters* of Alcohol with *two hundred cubic centimeters* of Water, and, having moistened the powder with *three hun-*

dred cubic centimeters of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Staphisagria is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.05 Cc. (1 minim).

FLUIDEXTRACTUM STILLINGIÆ

Fluidextract of Stillingia

[EXTRACTUM STILLINGIÆ FLUIDUM, PHARM. 1890]

Stillingia, in No. 40 powder, *one thousand grammes*	1000 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Stillingia is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM STRAMONII

Fluidextract of Stramonium

Stramonium, in No. 40 powder, *one thousand grammes* . . .	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *three hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Stramonium is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and mix thoroughly.

Assay *ten cubic centimeters* of this liquid, as directed below; from the results thus obtained, ascertain by calculation the amount of mydriatic alkaloids in the remainder of the liquid, and add to this enough menstruum to make each *one hundred cubic centimeters* of the finished Fluidextract contain 0.25 Gm. of the mydriatic alkaloids from Stramonium.

Assay of Fluidextract of Stramonium

The method to be employed is identical with that given for Fluidextract of Belladonna Root on page 168, using *ten cubic centimeters* of Fluidextract of Stramonium.

Average dose.— 0.05 Cc. (1 minim).

FLUIDEXTRACTUM SUMBUL

Fluidextract of Sumbul

Sumbul, in No. 30 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the

Sumbul is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

FLUIDEXTRACTUM TARAXACI

Fluidextract of Taraxacum

[EXTRACTUM TARAXACI FLUIDUM, PHARM. 1890]

Taraxacum, in No. 30 powder, *one thousand grammes*	1000 Gm.
Solution of Sodium Hydroxide, *fifty cubic centimeters* . .	50 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred cubic centimeters* of Diluted Alcohol, and pack it firmly in a cylindrical percolator; then add enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol, until the Taraxacum is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, add the Solution of Sodium Hydroxide, and enough Diluted Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.—8 Cc. (2 fluidrachms).

FLUIDEXTRACTUM TRITICI

Fluidextract of Triticum

[EXTRACTUM TRITICI FLUIDUM, PHARM. 1890]

Triticum, finely cut, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Pack the Triticum in a cylindrical metallic percolator, pour boiling Water upon it, and allow the percolation to proceed, supplying boiling water, as required, until the Triticum is exhausted. Evaporate the percolate to *seven hundred and fifty cubic centimeters*, and, having added to it *two hundred and fifty cubic centimeters* of Alcohol, mix well and set it aside for forty-eight hours. Then filter the liquid and add

to the filtrate enough of a mixture of Alcohol and Water made in the proportion of *one volume* of Alcohol to *three volumes* of Water to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 8 Cc. (2 fluidrachms).

FLUIDEXTRACTUM UVÆ URSI

Fluidextract of Uva Ursi

[Extractum Uvæ Ursi Fluidum, Pharm. 1890]

Uva Ursi, in No. 30 powder, *one thousand grammes*	1000 Gm.
Glycerin, *three hundred cubic centimeters*	300 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *two hundred cubic centimeters* of Alcohol and *five hundred cubic centimeters* of Water, and, having moistened the powder with *four hundred cubic centimeters* of the mixture, pack it moderately in a cylindrical glass percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding, first, the remainder of the menstruum, and afterwards a mixture of Alcohol and Water, made in the proportion of *two hundred cubic centimeters* of Alcohol to *five hundred cubic centimeters* of Water, until the Uva Ursi is exhausted. Reserve the first *eight hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough of the mixture of Alcohol and Water to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM VALERIANÆ

Fluidextract of Valerian

[Extractum Valerianæ Fluidum, Pharm. 1890]

Valerian, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Valerian is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM VERATRI

Fluidextract of Veratrum

[EXTRACTUM VERATRI VIRIDIS FLUIDUM, PHARM. 1890]

Veratrum, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *three hundred cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Veratrum is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract; dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 0.1 Cc. (1½ minims).

FLUIDEXTRACTUM VIBURNI OPULI

Fluidextract of Viburnum Opulus

[EXTRACTUM VIBURNI OPULI FLUIDUM, PHARM. 1890]

Viburnum Opulus, in No. 40 powder, *one thousand grammes* .	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *three hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it moderately in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Viburnum Opulus is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM VIBURNI PRUNIFOLII

Fluidextract of Viburnum Prunifolium

[Extractum Viburni Prunifolii Fluidum, Pharm. 1890]

Viburnum Prunifolium, in No. 40 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *three hundred cubic centimeters* of Water, and, having moistened the powder with *three hundred cubic centimeters* of the mixture, pack it moderately in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Viburnum Prunifolium is exhausted. Reserve the first *eight hundred and fifty cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM XANTHOXYLI

Fluidextract of Xanthoxylum

[EXTRACTUM XANTHOXYLI FLUIDUM, PHARM. 1890]

Xanthoxylum, in No. 40 powder, *one thousand grammes* . . .	1000 Gm.
Alcohol,	
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water, and, having moistened the powder with *two hundred and fifty cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator; then add enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Xanthoxylum is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the Fluidextract measure *one thousand cubic centimeters.*

Average dose.— 2 Cc. (30 minims).

FLUIDEXTRACTUM ZINGIBERIS

Fluidextract of Ginger

[EXTRACTUM ZINGIBERIS FLUIDUM, PHARM. 1890]

Ginger, in No. 50 powder, *one thousand grammes*	1000 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the powder with *two hundred and fifty cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Ginger is exhausted. Reserve the first *nine hundred cubic centimeters* of the percolate, and evaporate the remainder, at a temperature not exceeding 50° C. (122° F.), to a soft extract;

dissolve this in the reserved portion, and add enough Alcohol to make the Fluidextract measure *one thousand cubic centimeters*.

Average dose.—1 Cc. (15 minims).

FŒNICULUM

Fennel

The dried, nearly ripe fruit of *Fœniculum vulgare* Miller (Fam. *Umbelliferæ*).

Mericarps usually separated, each 4 to 10 Mm. long, and 2 to 3 Mm. broad, more or less curved, with five prominent, light-colored primary ribs, otherwise smooth, yellowish- or brownish-green; pericarp containing an oil-tube between each two ribs, and two upon the flat side; odor and taste aromatic, anise-like.

Average dose.—1 Gm. (15 grains).

FRANGULA

Frangula

The dried bark of *Rhamnus Frangula* Linné (Fam. *Rhamnaceæ*), collected at least one year before being used.

In quills of variable length, frequently flattened or crushed: bark 0.3 to 1 Mm. thick, externally grayish-brown to purplish-black, with numerous lenticels and occasional patches of foliaceous lichens: inner surface smooth, minutely striated, brownish-yellow to deep brown: fracture short and of a purplish tint in the outer layer, fibrous and pale yellow in the inner layer; odor distinct; taste somewhat aromatic, sweetish, and bitter; when chewed, imparting to the saliva a yellow color.

The powder should be free from stone cells, and the fragments are colored reddish by sodium hydroxide T.S.

Average dose.—1 Gm. (15 grains).

GALLA

Nutgall

An excrescence on *Quercus infectoria* Olivier (Fam. *Cupuliferæ*), caused by the punctures and deposited ova of *Cynips tinctoria* Olivier.

Subglobular, 1 to 2 Cm. in diameter, externally blackish olive-green or blackish-gray, more or less tuberculated above, the basal portion nearly smooth and contracted into a short stalk, sometimes with a perforation on one side; heavy; fracture horny, yellowish or grayish; in the centre a cavity containing either the partly developed insect, or pulverulent remains left by it; nearly inodorous; taste strongly astringent.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

GAMBIR

Gambir

[To replace CATECHU, PHARM. 1890]

An extract prepared from the leaves and twigs of *Ourouparia Gambir* (Hunter) Baillon (Fam. *Rubiaceæ*).

Irregular masses, or cubes about 25 Mm. in diameter; externally reddish-brown, pale brownish-gray, or light brown; fracture dull-earthy, friable, crystalline; inodorous, bitterish, very astringent, with a sweetish after-taste; free from starch.

Not less than 70 percent. should be soluble in alcohol; when incinerated, Gambir should not yield more than 5 percent. of ash.

Average dose.— 1 Gm. (15 grains).

GELATINUM

Gelatin

The purified air-dried product of the hydrolysis of certain animal tissues, as skin, ligaments, and bones, by treatment with boiling water.

An amorphous, more or less transparent solid, usually shredded or in thin sheets; colorless or with a slight yellowish tint, inodorous, and having a slight, characteristic, almost insipid taste. Unalterable in the air when dry, but putrefying rapidly when moist or in solution.

When incinerated, Gelatin is decomposed, leaving a slight mineral residue, which should not exceed 2 percent. of the original weight.

Gelatin is insoluble in cold water, but swells and softens when immersed in it, gradually absorbing from 5 to 10 times its weight of water. It is soluble in boiling water, acetic acid, and glycerin; insoluble in alcohol, ether, chloroform, benzene, carbon disulphide, and fixed and volatile oils.

When dissolved in boiling water (1 in 50), it should solidify upon cooling, and form a transparent jelly.

An aqueous solution of Gelatin (1 in 5000) is at once rendered turbid on the addition of tannic acid T.S., the precipitate being insoluble in the presence of an excess of the reagent.

Gelatin is precipitated from its aqueous solution by mercuric chloride T.S. in excess; it is not precipitated by a solution of alum, by ferric chloride T.S., or by lead acetate T.S.

If potassium dichromate T.S. be added to a solution of Gelatin in hot water, the jelly which forms on cooling becomes insoluble in warm water after exposure to light.

GELATINUM GLYCERINATUM

Glycerinated Gelatin

Gelatin, *one hundred grammes*	100 Gm.
Glycerin, *one hundred grammes*	100 Gm.
Water, *a sufficient quantity*,	
To make *two hundred grammes*	200 Gm

Pour upon the Gelatin sufficient Water, which has been previously boiled and cooled, to cover it; allow it to stand one hour; pour off the Water and allow the Gelatin to drain for a few minutes; then transfer it to a tared dish, add the Glycerin, and heat it on a water-bath until the Gelatin is dissolved. Strain the solution while hot, and continue to heat on the water-bath until the product weighs *two hundred grammes.* When cold, cut the mass into pieces, and preserve these in suitable containers.

GELSEMIUM

Gelsemium

The dried rhizome and roots of *Gelsemium sempervirens* (Linné) Aiton filius (Fam. *Loganiaceæ*).

Cylindrical, usually in cut pieces of variable length, from 5 to 20, or even 30 Mm. in diameter; externally light yellowish-brown, with purplish-brown longitudinal lines; fracture of the rhizome splintery, the roots breaking with one-half the fracture transverse, the other half oblique or short-splintery; bark about 1 Mm. thick; wood pale yellow, porous, but tough, with numerous distinct medullary rays, in the rhizome excentric, and with four groups of internal phloem; odor pronounced, characteristic; taste slightly aromatic, bitter.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

GENTIANA

Gentian

The dried rhizome and roots of *Gentiana lutea* Linné (Fam. *Gentianaceæ*).

In nearly cylindrical pieces or longitudinal slices, of variable length and from 5 to 35 Mm. thick; externally yellowish-brown, the rhizome annulate, the roots longitudinally wrinkled; fracture short but uneven, the bark rather thick, separated from the somewhat spongy, reddish-yellow or brownish inner portion by a dark brown cambium zone; odor strong, characteristic; taste slightly sweetish, strongly and persistently bitter.

The powder is free from starch grains and sclerenchymatic tissues.

Average dose.—1 Gm. (15 grains).

GERANIUM

Geranium

The dried rhizome of *Geranium maculatum* Linné (Fam. *Geraniaceæ*).

Of horizontal growth, cylindraceous, somewhat flattened and rather sharply tuberculated, 2.5 to 10 Cm. long and 3 to 15 Mm. in diameter; longitudinally wrinkled, dark brown; fracture short, light reddish-brown or purplish; bark
wood indistinct; central pith large; odor slight; taste strongly astringent.

dose.—1 Gm. (15 grains).

GLYCERITUM AMYLI

Glycerite of Starch

Starch, *ten grammes*	10 Gm.
Water, *ten cubic centimeters*	10 Cc.
Glycerin, *eighty grammes*	80 Gm.

Triturate the Starch with the Water, until a homogeneous mixture is produced. Then gradually add this to the Glycerin, contained in a porcelain dish, and heated to about 140° C. (284° F.). Continue the heat, with constant stirring, keeping it below 144° C. (291.2° F.), until a translucent jelly is formed. Transfer the product to suitable vessels, provided with well-fitting covers.

GLYCERITUM BOROGLYCERINI

Glycerite of Boroglycerin

Boric Acid, in fine powder, *three hundred and ten grammes*	310 Gm.
Glycerin, *a sufficient quantity,*	
To make *one thousand grammes*	1000 Gm.

Heat *four hundred and sixty grammes* of Glycerin, in a tared porcelain dish, to a temperature not exceeding 150° C. (302° F.), and add the Boric Acid in portions, constantly stirring. When all is added and dissolved, continue the heat at the same temperature, frequently stirring, and breaking up the film which forms on the surface. When the mixture has been reduced to the weight of *five hundred grammes*, add to it *five hundred grammes* of Glycerin, mix thoroughly, and transfer it to suitable vessels.

GLYCERITUM FERRI, QUININÆ ET STRYCHNINÆ PHOSPHATUM

Glycerite of the Phosphates of Iron, Quinine and Strychnine.

Soluble Ferric Phosphate, *eighty grammes*	80.0 Gm.
Quinine, *one hundred and four grammes*	104.0 Gm.
Strychnine, *eight-tenths of a gramme*	0.8 Gm.
Phosphoric Acid, *two hundred cubic centimeters*	200.0 Cc.
Glycerin, *five hundred cubic centimeters*	500.0 Cc.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Heat the Soluble Ferric Phosphate with *two hundred cubic centimeters* of Water, in a porcelain dish, at a temperature not exceeding 70° C. (158° F.), until it is dissolved. Then add the Phosphoric Acid with the Strychnine and Quinine and sufficient Water to make the product measure *five hundred cubic centimeters*, and stir until solution is effected. Mix the solution with the Glycerin, and filter if necessary.

Average dose.—1 Cc. (15 minims).

GLYCERITUM HYDRASTIS

Glycerite of Hydrastis

Hydrastis, in No. 60 powder, *one thousand grammes*	1000 Gm.
Glycerin, *five hundred cubic centimeters*	500 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Hydrastis with *three hundred and fifty cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until the Hydrastis is practically exhausted. Remove nearly all of the Alcohol by distillation or evaporation, pour the thick concentrated liquid into *five hundred cubic centimeters* of ice-cold Water, and set it aside, in a cold place, for twenty-four hours. Then filter, pass enough cold Water through the filter to make the filtrate measure *five hundred cubic centimeters*, add the Glycerin, and mix thoroughly.

Average dose.—2 Cc. (30 minims).

GLYCERITUM PHENOLIS

Glycerite of Phenol

[GLYCERITUM ACIDI CARBOLICI, PHARM. 1890]

Liquefied Phenol, *twenty cubic centimeters*	20 Cc.
Glycerin, *eighty cubic centimeters*	80 Cc.
To make *one hundred cubic centimeters* . .	100 Cc.

Add the Liquefied Phenol to the Glycerin, and stir until thoroughly mixed.

Average dose.—0.3 Cc. (5 minims).

GLYCYRRHIZA

Glycyrrhiza Licorice Root

The dried rhizome and root of *Glycyrrhiza glabra* Linné (Spanish Licorice), or of *Glycyrrhiza glandulifera* Waldstein and Kitaibel (Russian Licorice) (Fam. *Leguminosæ*).

Spanish Licorice.—Cylindrical, usually cut into pieces 14 to 20 Cm. or more long, 5 to 15 Mm. thick; longitudinally wrinkled, grayish-brown or dark-brown, pliable; fracture coarsely fibrous; internally tawny-yellow; bark 1 to 3 Mm. thick; wood porous, in narrow wedges; odor slight; taste sweetish and slightly acrid.

Russian Licorice.—Somewhat tapering, frequently 1 M. or more in length, 1 to 5 Cm. in diameter, deprived of the outer corky layer, when it is externally pale yellow; internally of a lighter yellow; wood rather soft; taste less sweet than that of the Spanish Licorice. Any blackened, knotty, bitter portions should be removed.

Average dose.— 2 Gm. (30 grains).

GLYCYRRHIZINUM AMMONIATUM

Ammoniated Glycyrrhizin

Glycyrrhiza, in No. 20 powder, *five hundred grammes*	**500 Gm.**
Water,	
Ammonia Water,	
Sulphuric Acid, each, *a sufficient quantity.*	

Mix *four hundred and seventy-five cubic centimeters* of Water with *twenty-five cubic centimeters* of Ammonia Water, and, having moistened the powder with the mixture, macerate for twenty-four hours. Then pack it moderately in a conical glass percolator, and gradually pour Water upon it until *five hundred cubic centimeters* of percolate are obtained. Add Sulphuric Acid slowly to the percolate, with constant stirring, so long as a precipitate is produced. Collect this on a strainer, wash it with cold Water until the washings no longer have an acid reaction, redissolve it in Water with the aid of Ammonia Water, filter, if necessary, and again add Sulphuric Acid so long as a precipitate is produced. Collect this, wash it, dissolve it in a sufficient quantity of Ammonia Water previously diluted with an equal volume of Water, and spread the clear solution upon plates of glass, so that, when dry, the product may be obtained in scales.

Dark brown or brownish-red scales, without odor, and having a very sweet taste.

Readily soluble in water and soluble in alcohol.

The aqueous solution, when heated with potassium hydroxide T.S., evolves ammonia.

If the aqueous solution be supersaturated with an acid, there will be produced a precipitate (glycyrrhizin) which, when dissolved in hot water, forms a jelly on cooling. This substance, after being washed with diluted alcohol and dried, appears as an amorphous, yellow powder, having a strong, bitter-sweet taste, and an acid reaction.

Upon incineration, Ammoniated Glycyrrhizin should not leave more than a trace of ash.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

GOSSYPII CORTEX

Cotton Root Bark

[Gossypii Radicis Cortex, Pharm. 1890]

The dried bark of the root of *Gossypium herbaceum* Linné, or of other cultivated species of *Gossypium* (Fam. *Malvaceæ*).

In thin, flexible bands or quilled pieces, the bark 0.2 to 1 Mm. thick; outer surface yellowish-brown, longitudinally wrinkled, with small lenticels, the periderm frequently exfoliated and somewhat fuzzy from partly detached bast fibres; inner surface whitish, longitudinally striate; fracture tough, fibrous, the bast-layer separable into thin laminæ; odor faint; taste slightly astringent and acrid.

Average dose.— 2 Gm. (30 grains).

GOSSYPIUM PURIFICATUM

Purified Cotton

The hairs of the seed of *Gossypium herbaceum* Linné, or of other cultivated species of Gossypium (Fam. *Malvaceæ*) freed from adhering impurities and deprived of fatty matter.

White, soft, fine filaments, appearing under the microscope as hollow, flattened and twisted bands, spirally striate, and slightly thickened at the edges; inodorous and tasteless; insoluble in ordinary solvents, but soluble in an ammoniacal solution of cupric oxide.

When Purified Cotton, previously compressed in the hand, is thrown on the surface of cold water, it should readily absorb the latter and sink, and the water should not acquire either an acid or an alkaline reaction (evidence of *proper purification* and absence of *fatty matter*).

Purified Cotton should be perfectly free from all visible impurities, and on combustion should not leave more than 0.3 percent. of ash.

GRANATUM

Pomegranate

The bark of the stem and root of *Punica Granatum* Linné (Fam. *Punicaceæ*).

Stem Bark.—In single quills or transversely curved pieces, mostly 2 to 10 Cm. long, 5 to 20 Mm. in diameter; bark 0.5 to 3 Mm. thick; outer surface yellowish- to brownish-gray, with brownish-black fruit-heads of a lichen and small lenticels; inner surface grayish-yellow to brownish, finely striate; fracture short, smooth, the phelloderm layer dark green, the inner bark dull greenish-yellow; odor distinct; taste astringent, somewhat bitter.

Root Bark.—Dark brown, with more or less longitudinal patches and scales of cork; green phelloderm layer absent; medullary rays extending nearly to the periderm.

Average dose.— 2 Gm. (30 grains).

GRINDELIA

Grindelia

The dried leaves and flowering tops of *Grindelia robusta* Nuttall, or of *Grindelia squarrosa* (Pursh) Dunal (Fam. *Compositæ*).

Leaves about 5 Cm. or less long, varying from broadly spatulate or oblong to lanceolate, sessile or clasping, obtuse, more or less sharply serrate, often spinosely toothed, or even laciniate-pinnatifid, pale green, smooth, finely dotted, somewhat coriaceous, brittle; heads more or less resinous-viscid, many-flowered, either conical-urceolate (*G. squarrosa*), or depressed-urceolate (*G. robusta*); the involucre hemispherical, about 10 Mm. broad, composed of numerous imbricated, squarrosely tipped or spreading scales; ray-florets yellow, ligulate, pistillate, sometimes absent; disk-florets yellow, tubular, perfect; pappus of two or three mostly unequal awns about the length of the disk-florets; odor balsamic; taste pungently aromatic and bitter.

Average dose.— 2 Gm. (30 grains).

GUAIACOL

Guaiacol

$C_7H_8O_2 = 123.13$

One of the chief constituents [$C_6H_4(OH)(OCH_3)$ 1:2] of creosote, the product from beechwood-tar, obtained by collecting and purifying the fraction of creosote boiling between 200° and 205° C. (392° and 401° F.); or prepared synthetically from either catechol by methylating, or from ortho-anisidin by diazotizing and boiling. Guaiacol should be preserved in amber-colored bottles, protected from light.

A colorless, crystalline solid, melting at 28.5° C. (83.3° F.), or a colorless, refractive liquid, boiling at 205° C. (401° F.), having an agreeable aromatic odor.

Specific gravity of liquid: from 1.110 to 1.114 at 25° C. (77° F.).

Soluble in 53 parts of water at 25° C. (77° F.), and in alcohol and ether in all proportions; soluble in acetic acid and in 1 part of glycerin.

The addition of ferric chloride T.S. to an alcoholic solution of Guaiacol (1 in 100) causes an immediate blue color, changing to emerald-green, and finally becoming yellowish.

If 2 Cc. of Guaiacol be shaken with 4 Cc. of petroleum benzin, the mixture should separate, on standing, into two distinct layers. Permanent turbidity or failure to separate into layers indicates the presence of impurities.

One Cc. of Guaiacol should dissolve in 2 Cc. of potassium hydroxide solution (15 percent.), when heated, and, on cooling, the mixture should congeal to a nearly white mass. Much coloration or failure to congeal indicates the presence of impurities. The mass thus obtained should form a clear solution with 20 volumes of water (turbidity indicates *oily hydrocarbons*).

Average dose.—0.5 Cc. (8 minims).

GUAIACOLIS CARBONAS

Guaiacol Carbonate

$(C_7H_7O)_2CO_3 = 272.05$

A guaiacol derivative $[(C_6H_4(OCH_3)O)_2.CO]$, obtained by the action of carbonyl chloride upon sodium-guaiacolate.

White, crystalline powder, of neutral reaction, almost tasteless and odorless. Insoluble in water; soluble in 48 parts of alcohol, 1.5 parts of chloroform, and 13 parts of ether at 25° C. (77° F.); readily soluble in hot alcohol and benzene; slightly soluble in glycerin and fatty oils.

When heated between 84° and 87° C. (183.2° and 188.6° F.), it fuses.

Guaiacol Carbonate is at once decomposed when treated with alcoholic potassium hydroxide T.S., and from the solution so obtained guaiacol may be separated on the addition of an acid.

An alcoholic solution of Guaiacol Carbonate should not yield a bluish-green color on the addition of ferric chloride T.S. (absence of *free guaiacol*).

Average dose.—1 Gm. (15 grains).

GUAIACUM

Guaiac

[GUAIACI RESINA, PHARM. 1890]

The resin of the wood of *Guaiacum officinale* Linné, or of *Guaiacum sanctum* Linné (Fam. *Zygophyllaceæ*).

Usually in irregular masses; externally greenish-gray brown; brittle, the fracture having a glassy lustre, in recent Guaiac yellowish-green or reddish-brown; transparent in thin splinters; fusible; odor balsamic; taste slightly acrid.

The powder is grayish, turning green on exposure to air.

Not more than 15 percent. of Guaiac is insoluble in alcohol, and the alcoholic solution becomes blue on the addition of tincture of ferric chloride; acid number not less than 70 nor more than 80; ash not more than 4 percent. The filtrate obtained on macerating the powder with 4 or 5 times its weight of petroleum benzin should be colorless, and should not give a green color on the addition of an equal volume of solution (1 in 1000) of cupric acetate (absence of *rosin*).

***Average dose.*—1 Gm. (15 grains).**

GUARANA

Guarana

A dried paste consisting chiefly of the crushed seeds of *Paullinia Cupana* Kunth (Fam. *Sapindaceæ*), yielding, when assayed by the process given below, not less than 3.5 percent. of its alkaloidal principles.

Usually in cylindrical sticks, about 3 to 5 Cm. in diameter, hard and heavy, dark reddish-brown; fracture uneven, often fissured in the centre, pale reddish-brown, showing numerous coarse fragments of seeds and their blackish-brown integuments; odor slight; taste astringent, somewhat smoky and pleasantly bitter, then sweetish.

Assay of Guarana

Guarana, in No. 60 powder, *six grammes* . . . . 6 Gm.
Chloroform,
Ether,
Ammonia Water,
Normal Sulphuric Acid V.S.,
Distilled Water, each, *a sufficient quantity.*

Introduce the Guarana into an Erlenmeyer flask, and pour upon it 120 Cc. of chloroform and 6 Cc. of ammonia water, and insert the stopper securely. Shake the flask at intervals for half an hour, and allow it to stand for four hours. Filter a sufficient quantity of the liquid into a measuring cylinder until 100 Cc. (representing 5 Gm. of Guarana) have been obtained, then transfer the filtrate to a flask, and distil off all of the chloroform by means of a water-bath. Dissolve the alkaloidal residue in a mixture of 2 Cc. of normal sulphuric acid V.S. and 20 Cc. of warm distilled water. Allow the liquid to cool, and filter it into a separator, rinse the flask and filter with several small portions of distilled water, add 20 Cc. of chloroform and 2 Cc. of ammonia water to the separator, and shake it for one minute. Draw off the chloroform into a tared flask and repeat the extraction with two portions of 10 Cc. each of chloroform. Distil off the chloroform from the combined liquids, and when the residue is dry, add 2 Cc. of ether and evaporate on a water-bath very carefully to avoid decrepitation; continue the heating until the weight of the residue after cooling remains constant. This weight multiplied by 20 will give the percentage of the alkaloidal principles contained in the Guarana.

Average dose.—2 Gm. (30 grains).

HÆMATOXYLON

Hematoxylon

The heart-wood of *Hæmatoxylon campechianum* Linné (Fam. *Leguminosæ*).

Usually in small chips, reddish-brown, the freshly cut surface dark yellowish-red; on transverse section the wood showing medullary rays which are four cells wide; odor faint, agreeable; taste sweetish, astringent.

Hematoxylon imparts to water containing a little acid a yellowish color, which is changed to purple or violet-red by alkalies.

When the surface has a greenish metallic lustre, the wood has undergone fermentation and should be rejected.

HAMAMELIDIS CORTEX

Hamamelis Bark

The bark and twigs of *Hamamelis virginiana* Linné (Fam. *Hamamelidaceæ*).

In irregularly quilled or bent pieces, 1 to 2 Mm. thick; outer surface grayish-brown, with numerous lenticels, or reddish-brown, with short transverse ridges or scars, or somewhat scaly in older bark; the thin, corky layer easily removed from the pale cinnamon-colored middle bark; inner surface pale cinnamon-colored, or sometimes yellowish, smooth, or finely striate; fracture of young bark short, of old bark tough in the bast layer; odor faint; taste astringent, somewhat bitter and pungent. Twigs flexible and tough, of irregular length, not more than 6 Mm. in diameter, branching, or bearing nodes at intervals of 2 to 5 Cm.; externally varying from yellowish-brown to deep purplish-brown, lightly longitudinally wrinkled, and having scattered small circular whitish or pale lenticels; bark occupying about one-fifth of the radius; wood greenish-white, lightly radiate, and exhibiting one to three annual rings; pith centric, small.

Average dose.—2 Gm. (30 grains).

HAMAMELIDIS FOLIA

Hamamelis Leaves

[HAMAMELIS, PHARM. 1890]

The dried leaves of *Hamamelis virginiana* Linné (Fam. *Hamamelidaceæ*), collected in autumn.

Short-petiolate; blade inequilaterally obovate or oval, about 10 Cm. long; base slightly heart-shaped and oblique, margin coarsely sinuate; upper surface pale or brownish-green; under surface light green, with a satiny lustre, the midrib and veins prominent, the few hairs having much thickened walls and a very small lumen; petiole short, stout; odor slight; taste astringent, slightly aromatic and bitter.

Average dose.—2 Gm. (30 grains).

HEDEOMA

Hedeoma

The dried leaves and flowering tops of *Hedeoma pulegioides* (Linné) Persoon (Fam. *Labiatæ*).

Branchlets quadrangular, with numerous spreading hairs; leaves opposite, short-petioled, oblong-ovate, 15 to 35 Mm. long, thin, obtuse, obscurely serrate, glandular-hairy beneath; flowers in axillary fascicles, with a tubular-ovoid, bilabiate and 5-toothed calyx, and a pale blue, spotted, bilabiate corolla, containing two sterile and two fertile, exserted stamens; odor strong, somewhat mint-like; taste aromatic and pungent.

Average dose.—8 Gm. (120 grains).

HEXAMETHYLENAMINA

Hexamethylenamine

$C_6H_{12}N_4 = 139.18$

A condensation product [Hexamethylene-tetramine, $(CH_2)_6N_4$], obtained by the action of ammonia upon formaldehyde. It should be kept in well-stoppered bottles.

Colorless, lustrous, odorless crystals, having, when in aqueous solution, an alkaline reaction upon red litmus paper.

Soluble in about 1.5 parts of water, 10 parts of alcohol, and in 228 parts of ether at 25° C. (77° F.); in 1.5 parts of water at 100° C. (212° F.), and in about 8 parts of hot alcohol.

When heated to 263° C. (505.4° F.) it sublimes without melting and with partial decomposition.

If 0.1 Gm. of Hexamethylenamine be mixed with 0.1 Gm. of salicylic acid and 5 Cc. of sulphuric acid, and then heated moderately, a carmine-red color should be produced.

If an aqueous solution of Hexamethylenamine (1 in 10) be heated with diluted sulphuric acid, it is decomposed with the liberation of formaldehyde (recognized by its odor or by its darkening paper moistened with silver ammonium nitrate T.S.).

If an aqueous solution (1 in 10) be heated with diluted sulphuric acid and then supersaturated with solution of sodium hydroxide, ammonia is liberated.

If to an aqueous solution (1 in 10) tannic acid T.S. be added, a precipitate is formed. If mercuric chloride T.S. be added to an aqueous solution (1 in 10), a precipitate is produced which on standing forms crystalline needles.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

HOMATROPINÆ HYDROBROMIDUM

Homatropine Hydrobromide

$C_{16}H_{21}NO_3.HBr = 353.49$

The hydrobromide [$HBr.C_{16}H_{21}NO_3$] of an alkaloid obtained by the condensation of tropine and mandelic acid. It should be kept in well-stoppered vials, protected from light.

A white, odorless, crystalline powder, or rhombic prisms, having a bitter taste.

Soluble in 5.7 parts of water, 32.5 parts of alcohol, and in 620 parts of chloroform at 25° C. (77° F.); soluble in 8.7 parts of alcohol at 60° C. (140° F.); insoluble in ether.

At 213.8° C. (417° F.) it melts. It leaves no residue upon incineration.

Its aqueous solution is neutral to litmus paper, and is not precipitated by tannic acid T.S. or platinic chloride T.S. It contains no water of crystallization.

If 2 Cc. of chloroform be shaken with 1 Cc. of an aqueous solution of the salt (1 in 10) to which a few drops of chlorine water have been cautiously added, the chloroform should assume a brownish color.

Iodine T.S., when added to solutions of Homatropine Hydrobromide, produces a brown precipitate; silver nitrate T.S., a creamy white precipitate.

If to an aqueous solution containing 0.1 Gm. of the salt an excess of potassium hydroxide T.S. be added, this liquid shaken out with ether, and the ether allowed to evaporate spontaneously, the crystals which form should have a melting point of 96° C. (204.8° F.).

If 1 Cc. of an aqueous solution of the salt (1 in 100) be made alkaline with ammonia water, shaken out with chloroform, and the chloroformic solution evaporated to dryness, the residue should turn yellow and finally brick-red when warmed with about 1.5 Cc. of a solution made by dissolving 1 part of mercuric chloride in 50 parts of a mixture of alcohol 5 volumes and water 3 volumes (absence of *most other alkaloids* except *atropine* and *hyoscyamine*).

If sulphuric acid containing a trace of potassium dichromate be added to a crystal of the salt, an evanescent pink color will be produced, which changes rapidly to green.

If 0.01 Gm. of the salt be added to 5 drops of nitric acid, and evaporated to dryness in a porcelain dish, the residue should not acquire a violet color upon the addition of a few drops of alcoholic potassium hydroxide T.S. (absence of *atropine*, *hyoscyamine*, or *hyoscine*).

Average dose.— 0.0005 Gm. = 0.5 milligramme ($\frac{1}{128}$ grain).

HUMULUS

Hops

The carefully dried strobiles of *Humulus Lupulus* Linné (Fam. *Moraceæ*), bearing their natural glandular trichomes.

Ovoid-cylindrical, about 3 Cm. long, consisting of a thin, hairy flexuous rachis and numerous yellowish-green to pale brown obliquely ovate, membranaceous scales with a glandular-hairy base, frequently infolded on one side, enclosing a subglobular, light brown, very glandular akene; odor strong and agreeable; taste aromatic and bitter.

Average dose.— 2 Gm. (30 grains).

HYDRARGYRI CHLORIDUM CORROSIVUM

Corrosive Mercuric Chloride

$HgCl_2 = 268.86$

It should contain not less than 99.5 percent. of pure Mercuric Chloride, and be kept in well-stoppered bottles.

Heavy, colorless, rhombic crystals, or crystalline masses, odorless, and having an acrid and persistent metallic taste; permanent in the air.

When in fine powder, it is soluble in 13 parts of water, 3 parts of alcohol, and in about 14 parts of glycerin at 25° C. (77° F.); soluble in 2 parts of boiling water, and in 1.2 parts of boiling alcohol.

If 1 Gm. of finely powdered Mercuric Chloride be dissolved in 10 Cc. of alcohol or 20 Cc. of water, it should leave not more than 0.005 Gm. of residue.

It fuses at 265° C. (509° F.) to a colorless liquid, and at about 300° C. (572° F.) it volatilizes in dense, white vapors, leaving no appreciable residue.

The aqueous solution reddens blue litmus paper, but becomes neutral to litmus paper upon the addition of sodium chloride.

With ammonia water the aqueous solution of the salt yields a white precipitate; with an excess of hydrogen sulphide a black one; with potassium iodide T.S. a red one, soluble in an excess of the reagent; and with silver nitrate T.S. a white precipitate, insoluble in nitric acid.

If to 0.5 Gm. of Mercuric Chloride, dissolved in 20 Cc. of water, 5 Cc. of hydrochloric acid be added, and the solution be completely saturated with hydrogen sulphide, allowed to stand for several hours in a well-corked flask until the precipitate has subsided, and then filtered, the filtrate should be colorless and leave no weighable residue upon evaporation (absence of many *foreign salts*).

If the precipitate obtained in the preceding test, after washing with about 100 Cc. of water and draining, be rinsed into a beaker with about 20 Cc. of water, and then 5 Cc. of stronger ammonia water added, and if after covering and digesting the mixture for about 15 minutes on a bath of boiling water, it be rinsed upon a filter and washed with a little water, the filtrate and washings after evaporating to dryness, moistening with 6 drops of nitric acid, and again drying, should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17). If the precipitated sulphide remaining upon the filter be treated with diluted nitric acid (1 in 4), warmed, and then filtered, the filtrate should leave no weighable residue upon evaporation and gentle ignition (limit of *foreign metals*).

Average dose.— 0.003 Gm. = 3 milligrammes ($\frac{1}{20}$ grain).

HYDRARGYRI CHLORIDUM MITE

Mild Mercurous Chloride

HgCl = 233.68

It should contain not less than 99.5 percent. of pure Mercurous Chloride, and be kept in dark amber-colored bottles.

A white, impalpable powder, becoming yellowish-white on being triturated with strong pressure, and showing only small, isolated crystals when viewed under a lens having a magnifying power of one hundred diameters. It is odorless and tasteless, and permanent in the air.

Insoluble in water, alcohol, or ether, and also in cold dilute acids.

When strongly heated, Mercurous Chloride is volatilized without fusion or the evolution of brown vapors, leaving no appreciable residue.

In contact with calcium hydroxide T.S., or with solutions of alkali hydroxides, or with ammonia water, the salt is blackened.

When heated with dried sodium carbonate in a dry glass tube, it yields a sublimate of metallic mercury.

If 1 Gm. of the salt be shaken with 10 Cc. of water or alcohol, and the mixture filtered, neither of the filtrates should respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121), nor should any appreciable residue be left on evaporation (absence of *soluble impurities*).

If 2 Gm. of the salt be shaken with 20 Cc. of ether, filtered, the filtrate evaporated, and 10 Cc. of distilled water added, not more than a slight opalescence should result upon the addition of silver nitrate T.S. to 5 Cc. of the filtrate, and no change in color should be produced upon adding a few drops of ammonium sulphide T.S. to the remainder (absence of *mercuric chloride*).

On heating a portion of the salt in a test-tube with potassium hydroxide T.S., it should not evolve ammonia; and if another portion be shaken with acetic acid, and filtered, the filtrate should not be affected by hydrogen sulphide T.S., nor by silver nitrate T.S. (distinction from, and absence of, *ammoniated mercury*).

If to 0.5 Gm. of Mercurous Chloride contained in a small beaker, 5 Cc. of nitric acid be added, and the mixture evaporated to dryness on a water-bath, and if, after dissolving the residue in about 25 Cc. of distilled water and 5 Cc. of hydrochloric acid, the solution be completely saturated with hydrogen sulphide, and allowed to stand for several hours in a well-corked flask, until the precipitate has subsided, and then filtered, the filtrate should be colorless and leave no weighable residue upon evaporation and gentle ignition (absence of many *foreign salts*).

If the precipitate obtained in the preceding test, after washing with about 100 Cc. of water, and draining, be rinsed into a beaker with about 20 Cc. of water and then 5 Cc. of stronger ammonia water added, and if, after covering and digesting the mixture for about 15 minutes on a water-bath, it be rinsed upon a filter and washed with a little water, the filtrate and washings, after evaporating to dryness, moistening with 6 drops of nitric acid, and again drying, should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17). If the precipitated sulphide remaining upon the filter be treated with diluted nitric acid (1 in 4), warmed, and then filtered, the filtrate should leave no weighable residue upon evaporation and gentle ignition (limit of *foreign metals*).

Average dose.—
Laxative, 0.125 Gm. = 125 milligrammes (2 grains).
Alterative, 0.065 Gm. = 65 milligrammes (1 grain).

HYDRARGYRI IODIDUM FLAVUM

Yellow Mercurous Iodide

HgI = 324.40

It should contain not less than 99.5 percent. of pure Mercurous Iodide.

Mercury, *fifty grammes*	50 Gm.
Nitric Acid,	
Potassium Iodide,	
Distilled Water, each, *a sufficient quantity.*	

Mix *twenty cubic centimeters*, each, of Nitric Acid and Distilled Water, and, when the liquid is cold, pour it upon the Mercury contained in a glass beaker. Set the mixture aside in a dark place, and keep it at a temperature between 25° and 30° C. (77° and 86° F.), with occasional agitation, until the reaction ceases and a little mercury still remains undissolved. Separate the crystals of mercurous nitrate, which will have formed, from the mother-liquor, allow them to drain in a glass funnel, and dry them on bibulous paper, in a dark place. When the salt is dry dissolve *forty grammes* of it in *six hundred and fifty cubic centimeters* of Distilled Water to which *six cubic centimeters* of Nitric Acid have previously been added. Having prepared a solution of *sixteen grammes* of Potassium Iodide in *thirty-two cubic centimeters* of Distilled Water, slowly pour the solution of Potassium Iodide into the solution of Mercurous Nitrate, with constant stirring, which should be continued for fifteen minutes, allow the precipitate to subside, decant the supernatant liquid, and wash the precipitate by decantation with ten successive portions of *five hundred cubic centimeters* each of Distilled Water. Finally, transfer the precipitate to a filter, and dry it between sheets of bibulous paper, in a dark place, at a temperature not exceeding 40° C. (104° F.), and keep it in dark amber-colored vials, with the least possible exposure to light.

Instead of weighing off *forty grammes* of the Mercurous Nitrate as above directed, the whole of the crystallized salt may be taken and the amount of Potassium Iodide, etc., adjusted to the proportions given above.

A bright yellow, amorphous powder, odorless and tasteless. By exposure to light it becomes darker, in proportion as it undergoes decomposition into metallic mercury and mercuric iodide.

Almost insoluble in water, and wholly insoluble in alcohol or ether.

When slowly and moderately heated, it assumes at first an orange and then a red color, becoming yellow again on cooling. When quickly and strongly heated, it is at first partially decomposed into mercury and mercuric iodide, and finally is volatilized, leaving not more than 0.05 percent. of residue.

When Mercurous Iodide is heated with sulphuric acid and a little manganese dioxide, vapor of iodine is evolved.

In contact with a solution of potassium iodide, the salt is decomposed into mercuric iodide, which dissolves, and metallic mercury, which remains undissolved.

If 0.5 Gm. of the salt be shaken with 10 Cc. of alcohol and the mixture allowed to stand and then filtered, a portion of the perfectly clear filtrate should be scarcely affected by hydrogen sulphide T.S., nor should it produce more than a very faint, transient opalescence when dropped into water; and if 5 Cc. of the filtrate be evaporated on a white porcelain surface, not more than a very faint, red stain should remain (absence of more than traces of *mercuric iodide*).

Average dose.— 0.010 Gm. = 10 milligrammes ($\frac{1}{6}$ grain).

HYDRARGYRI IODIDUM RUBRUM

Red Mercuric Iodide

$HgI_2 = 450.30$

It should contain not less than 98.5 percent. of pure Mercuric Iodide.

Corrosive Mercuric Chloride, *forty grammes*	**40 Gm.**
Potassium Iodide, *fifty grammes*	**50 Gm.**
Distilled Water, *a sufficient quantity.*	

Dissolve the Corrosive Mercuric Chloride and the Potassium Iodide, each, in *eight hundred cubic centimeters* of Distilled Water, and filter the solutions separately. Pour both solutions, simultaneously and in a thin stream, with constant and very active stirring, into *two thousand cubic centimeters* of Distilled Water. When the precipitate has subsided, decant the supernatant liquid, collect the precipitate on a filter, and wash it with cold Distilled Water, until the washings give not more than a slight opalescence with silver nitrate test solution. Finally, dry it in a dark place, between sheets of bibulous paper, at a temperature not exceeding 40° C. (104° F.), and keep it in well-stoppered bottles, protected from light.

A scarlet-red, amorphous powder, odorless and tasteless; permanent in the air.

Almost insoluble in water; soluble in 116 parts of alcohol, 55 parts of ether, and 1340 parts of chloroform at 25° C. (77° F.); soluble in 15 parts of boiling alcohol, also soluble in solutions of the soluble iodides, mercuric chloride, sodium thiosulphate, and hot solutions of the alkali chlorides.

When heated to about 150° C. (302° F.), the salt becomes yellow, but again assumes a red color on cooling; at 253° C. (487.4° F.) it fuses to a dark yellow liquid, which, on cooling, forms a yellow, crystalline mass, and at higher temperatures is finally volatilized, leaving not more than 0.05 percent. of residue.

On heating the salt with potassium hydroxide T.S., and adding a little sugar of milk, metallic mercury is precipitated.

A saturated solution of Mercuric Iodide in hot alcohol should, after cooling, be colorless, and when diluted with an equal volume of water, the solution should not redden blue litmus paper (absence of *mercuric chloride*).

If about 0.5 Gm. of Mercuric Iodide be thoroughly agitated with 10 Cc. of distilled water, the filtered liquid should not become more than slightly colored by hydrogen sulphide T.S., nor give more than a slight opalescence with silver nitrate T.S. (limit of soluble *chlorides* or *iodides*).

Average dose. — 0.003 Gm. = 3 milligrammes ($\frac{1}{20}$ grain).

HYDRARGYRI OXIDUM FLAVUM

Yellow Mercuric Oxide

$HgO = 214.38$

It should contain not less than 99.5 percent. of pure Yellow Mercuric Oxide.

Corrosive Mercuric Chloride, *one hundred grammes*	100 Gm.
Sodium Hydroxide, *forty grammes*	40 Gm.
Distilled Water, *a sufficient quantity*.	

Dissolve the Corrosive Mercuric Chloride in *one thousand cubic centimeters* of warm Distilled Water, and filter the solution. Dissolve the Sodium Hydroxide (which should contain at least 90 percent. of pure, anhydrous sodium hydroxide) in *one thousand cubic centimeters* of cold Distilled Water, and into this solution pour gradually, and with constant stirring, the solution of Corrosive Mercuric Chloride. Allow the mixture to stand for an hour at a temperature of about 30° C. (86° F.), stirring frequently. Then decant the supernatant, clear liquid from the precipitate, and wash the latter repeatedly by the addition and decantation of portions of Distilled Water, using *one thousand cubic centimeters* of Water each time. Collect the precipitate on a strainer, and continue the washing with warm Distilled Water, until a small portion of the washings, when poured on a little mercuric chloride test solution, no longer produces a yellowish turbidity at the line of contact of the two liquids. Then allow the precipitate to drain, and dry it between sheets of bibulous paper, in a dark place, at a temperature not exceeding 30° C. (86° F.), and keep it in well-stoppered bottles, protected from light.

A light orange-yellow, amorphous, heavy, impalpable powder; odorless, and having a somewhat metallic taste; permanent in the air, but turning darker on exposure to light.

Almost insoluble in water, insoluble in alcohol, but readily and completely soluble in diluted hydrochloric or nitric acid, forming colorless solutions.

When moderately heated, Yellow Mercuric Oxide assumes a red color. At a red heat it is completely decomposed into oxygen and metallic mercury, and is finally volatilized, leaving not more than 0.1 percent. of residue.

When moistened with hot water, Yellow Mercuric Oxide should not turn red litmus paper blue.

If 0.5 Gm. of Yellow Mercuric Oxide be digested on a water-bath, for fifteen minutes, with a solution of 1 Gm. of oxalic acid in 10 Cc. of water, it will be converted into white mercuric oxalate (distinction from *red mercuric oxide*).

On dissolving 0.1 Gm. of the Oxide in 10 Cc. of diluted nitric acid, the resulting solution should be clear, and should not afford more than a slight opalescence with silver nitrate T.S. (limit of *chlorides*).

The solution of 0.5 Gm. of the Oxide in a mixture of 2 Cc. of hydrochloric acid and 25 Cc. of water, should not respond to the tests for *foreign salts, metals*, or *arsenic*, as described under *Hydrargyri Chloridum Mite*.

HYDRARGYRI OXIDUM RUBRUM

Red Mercuric Oxide

$HgO = 214.38$

It should contain not less than 99.5 percent. of pure Red Mercuric Oxide, and should be kept in well-stoppered bottles, protected from light.

Heavy, orange-red, crystalline scales, or a crystalline powder, becoming more yellow the finer it is divided; odorless, and having a somewhat metallic taste; permanent in the air.

Almost insoluble in water, insoluble in alcohol, but readily soluble in diluted nitric acid, forming a clear solution, or in hydrochloric acid (1 in 10) with faint opalescence.

When heated to about 400° C. (752° F.), Red Mercuric Oxide becomes dark violet or almost black, but assumes its original color on cooling. At a red heat it is completely decomposed into oxygen and metallic mercury, and is finally volatilized, leaving no appreciable residue.

If 0.5 Gm. be digested on a water-bath with a solution of 1 Gm. of oxalic acid in 10 Cc. of water, it will not change color within two hours (distinction from *yellow mercuric oxide*).

If 1 Gm. of Red Mercuric Oxide be mixed with 5 Cc. of water, and 2 Cc. of sulphuric acid added, the mixture cooled, and 2 Cc. of ferrous sulphate T.S. be carefully poured upon it, no brown zone should be developed at the line of contact upon standing (absence of *nitrate*).

On dissolving 0.1 Gm. of the Oxide in 10 Cc. of diluted nitric acid, the resulting solution should be clear, and should not produce more than a slight opalescence with silver nitrate T.S. (limit of *chlorides*).

The solution of 0.5 Gm. of the Oxide in a mixture of 2 Cc. of hydrochloric acid and 25 Cc. of water, should not respond to the tests for *foreign salts, metals*, or *arsenic*, as described under *Hydrargyri Chloridum Mite*.

HYDRARGYRUM

Mercury

$Hg = 198.50$

It should contain not less than 99.9 percent. of pure metallic Mercury, and should be kept in strong, well-stoppered bottles.

A shining, silver-white metal, without odor or taste.

It is liquid at ordinary temperatures and easily divisible into spherical globules; but when cooled to —39.38° C. (—38.88° F.), it forms a ductile, malleable mass.

Specific gravity: 13.535 at 25° C. (77° F.).

Insoluble in the ordinary solvents, also in concentrated hydrochloric acid, and, at ordinary temperatures, in sulphuric acid; but it dissolves in the latter when boiled with it, and is readily and completely soluble in nitric acid.

At ordinary temperatures it volatilizes very slowly, more rapidly as the temperature increases, and at 357.25° C. (675.05° F.), it boils and is completely volatilized, yielding a colorless, very poisonous vapor, and no appreciable residue.

When globules of Mercury are dropped upon white paper, they should roll about freely, retaining their globular form, and leaving no streaks or traces.

It should be perfectly dry and present a bright surface even after agitation in contact with air.

On boiling 5 Gm. of Mercury with 5 Cc. of water and 4.5 Gm. of sodium thiosulphate, in a test-tube, for about one minute, the Mercury should not lose its lustre, and should not acquire more than a slightly yellowish shade (absence of more than *slight traces* of *foreign metals*).

HYDRARGYRUM AMMONIATUM

Ammoniated Mercury

$HgNH_2Cl = 249.61$

It should contain not less than 78 percent. nor more than 80 percent. of metallic mercury.

Corrosive Mercuric Chloride, in powder, *one hundred grammes*	**100 Gm.**
Ammonia Water,	
Distilled Water, each, *a sufficient quantity.*	

Dissolve the Corrosive Mercuric Chloride in *two thousand cubic centimeters* of warm Distilled Water, filter the solution, and allow it to cool. Pour the filtered liquid gradually, and with constant stirring, into *one hundred and fifty cubic centimeters* of Ammonia Water, taking care that the latter shall remain in slight excess. Collect the precipitate on a filter, and, when the liquid has drained from it as much as possible, wash it with a mixture of *four hundred cubic centimeters* of Distilled Water and *twenty cubic centimeters* of Ammonia Water. Finally, dry the precipitate between sheets of bibulous paper, in a dark place, at a temperature not exceeding 30° C. (86° F.), and keep it in well-stoppered bottles, protected from light.

White, pulverulent pieces, or a white, amorphous powder, without odor, and having an earthy, afterwards styptic and metallic taste; permanent in the air.

Insoluble in water or in alcohol. By prolonged washing with water it is gradually decomposed, assuming a yellow color, and becoming converted into a basic salt. Readily soluble in warm hydrochloric, nitric, or acetic acid, and in a cold solution of ammonium carbonate. Also completely soluble in a cold solution of sodium thiosulphate, with the evolution of ammonia; when this solution is heated for a short time, red mercuric sulphide is separated, which, on protracted boiling, turns black.

At a temperature below a red heat Ammoniated Mercury is decomposed without fusion, and at a red heat it is wholly volatilized.

When heated with potassium hydroxide T.S., the salt turns yellow, and evolves vapor of ammonia.

The solution of the salt in diluted nitric acid gives with potassium iodide T.S. a red precipitate, and with silver nitrate T.S. a white precipitate.

The salt should be soluble in hydrochloric acid without effervescence (absence of *carbonate*), and without leaving a residue (absence of *mercurous salt*).

The solution of 0.5 Gm. of Ammoniated Mercury in 2 Cc. of hydrochloric acid diluted with water to 25 Cc., should not respond to the tests for *foreign salts, metals*, and *arsenic*, as described under *Hydrargyri Chloridum Mite.*

HYDRARGYRUM CUM CRETA

Mercury with Chalk

Mercury, *thirty-eight grammes*	38 Gm.
Clarified Honey, *ten grammes*	10 Gm.
Prepared Chalk, *fifty-seven grammes*	57 Gm.
Water, *a sufficient quantity*,	
To make *one hundred grammes* . .	100 Gm.

Weigh the Mercury and Clarified Honey successively into a strong bottle of the capacity of *one hundred cubic centimeters*, and add *two cubic centimeters* of Water. Cork the bottle, and shake it for about half an hour at a time, until the aggregate time of shaking reaches ten hours, or until the globules of Mercury are no longer visible under a lens magnifying *four diameters*. The shaking may be more conveniently performed by mechanical means. Rub the Prepared Chalk with Water, in a mortar, to a thick, creamy paste, and, having added the contents of the bottle, washing the last portions in with a little Water, triturate the whole to a uniform mixture. Finally, dry the mixture, first between ample layers of bibulous paper, and afterwards in a dish at the ordinary temperature, until it weighs *one hundred grammes*. Then reduce it to a uniform powder, without trituration, and keep it in well-stoppered bottles, protected from light.

A light gray, rather damp powder, free from grittiness, without odor, and having a slightly sweetish taste.

If a portion of the powder be digested with warm acetic acid, the chalk is dissolved with effervescence, leaving a residue of finely divided mercury. The filtrate should not become more than slightly opalescent on the addition of a few drops of hydrochloric acid (limit of *mercurous oxide*).

If 0.1 Gm. of the powder be digested with 20 Cc. of warm diluted hydrochloric acid, the filtrate should not be affected by hydrogen sulphide T.S. (limit of *mercuric oxide*).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

HYDRASTINA

Hydrastine

$C_{21}H_{21}NO_6 = 380.32$

An alkaloid obtained from Hydrastis. It should be kept in well-stoppered bottles.

White to creamy white, glistening prisms, sometimes of large size, possessing a bitter taste, and permanent in the air. It contains no water of crystallization.

Almost insoluble in water at 25° C. (77° F.); soluble in 135 parts of alcohol, 124 parts of ether, and in 2 parts of chloroform at 25° C. (77° F.); soluble in 4000 parts of water at 80° C. (176° F.), and in 17 parts of alcohol at 60° C. (140° F.); easily soluble in benzene.

Hydrastine melts at 131° C. (267.8° F.).

It shows an alkaline reaction to moistened litmus paper, and is lævogyrate.

Sulphuric acid produces a yellow color when added to Hydrastine, and on heating, a purple color is developed.

Sulphuric acid containing a trace of molybdic acid gives a green color, changing to olive-green and then to brown; nitric acid yields a reddish-yellow color; sulphuric acid containing a trace of selenous acid gives a yellowish-red color, changing to brown.

Sulphuric acid containing a trace of potassium dichromate produces a red color, changing to brown.

If a crystal of Hydrastine be dissolved in diluted sulphuric acid and a solution of potassium permanganate (1 in 10) be added, a blue fluorescence will be developed (distinction from *hydrastinine*).

Average dose.—0.010 Gm. = 10 milligrammes (⅙ grain).

HYDRASTININÆ HYDROCHLORIDUM

Hydrastinine Hydrochloride

$C_{11}H_{11}NO_2.HCl = 223.88$

[HYDRASTININÆ HYDROCHLORAS, PHARM. 1890]

The hydrochloride [$HCl.C_{11}H_{11}NO_2$] of an artificial alkaloid derived from hydrastine. It should be kept in well-stoppered bottles.

Light yellowish needles, or a yellowish-white, crystalline powder; odorless, and having a bitter taste.

Very soluble in cold and hot water, and in alcohol; soluble in 286 parts of chloroform and 1800 parts of ether at 25° C. (77° F.).

Hydrastinine Hydrochloride melts at 212° C. (413.6° F.).

Its aqueous solution, especially when highly diluted, shows a blue fluorescence, and is neutral to litmus paper. On ignition the salt should be completely consumed.

In an aqueous solution of the salt (1 in 20), bromine T.S. produces a yellow precipitate, which should be perfectly soluble in ammonia water, forming an almost colorless solution.

In an aqueous solution of the salt, potassium dichromate T.S. produces a precipitate which redissolves if gently heated, but on cooling the solution, it separates in glistening needles.

If ammonia water be added to an aqueous solution of Hydrastinine Hydrochloride (1 in 20), no turbidity should be produced.

On slowly adding to a solution of 0.2 Gm. of the salt in 3 Cc. of water 4 to 5 drops of a solution of sodium hydroxide (1 in 7), each drop will cause a milky turbidity, which disappears again on shaking. From this solution, after standing for some time, pure white hydrastinine should separate, and the supernatant fluid should be almost colorless.

With a crystal of the salt, sulphuric acid or nitric acid produces a deep yellow color; sulphuric acid with a trace of nitric acid, a reddish-brown color; sulphuric acid with a crystal of ammonium vanadate, a light brown color changing to dark brown.

Average dose.— 0.030 Gm. = 30 milligrammes (½ grain).

HYDRASTIS

Hydrastis

The dried rhizome and roots of *Hydrastis canadensis* Linné (Fam. *Ranunculaceæ*), yielding, when assayed by the process given below, not less than 2.5 percent. of hydrastine.

Rhizome of oblique growth, subcylindrical, straight or somewhat tortuous, 2 to 5 Cm. long, and 3 to 6 Mm. in diameter, with short stem remnants, or stem scars, and slightly annulate; externally brownish-gray to yellowish-brown; fracture short, waxy, deep yellow; bark about 0.5 Mm. thick, wood wedges bright yellow, pith large, light yellow; the roots thin, brittle, with a thick yellow bark and a somewhat quadrangular wood; odor distinct; taste bitter.

Sections of Hydrastis treated with sulphuric acid show under the microscope the separation of the alkaloids in prismatic, tabular, and acicular crystals.

Assay of Hydrastis

Hydrastis, in No. 60 powder, *fifteen grammes* . . . . **15 Gm.**
Ether,
Ammonia Water,
Distilled Water,
Normal Sulphuric Acid V.S., each, *a sufficient quantity*.

Introduce the Hydrastis into an Erlenmeyer flask of 250 Cc. capacity, add 150 Cc. of ether, shake the flask occasionally during ten minutes, and add 5 Cc. of ammonia water, again shaking the flask at intervals during half an hour. Then add 15 Cc. of distilled water to the mixture in the flask and shake it until the drug collects in masses, and at once pour off, into a measuring cylinder, 100 Cc. of the supernatant ether-solution and transfer it to a separator. Add 15 Cc. of normal sulphuric acid V.S. to the separator, and shake it moderately during one minute. Allow the liquids to separate, and draw off the lower acid liquid into a second separator. Again shake out the ether-solution with 5 Cc. of normal sulphuric acid V.S. and 5 Cc. of distilled water, and shake the separator for one minute. After the liquids have separated, draw off the acid solution as before into the second sep-

[illegible] distilled water, drawing this also [illegible] a small piece of red litmus paper into the [illegible] water to render the liquid alkaline, and [illegible] the separator moderately during one minute. [illegible] of the lower alkaline liquid into [illegible] beaker. Again, shake out [illegible] shake the separator for one minute, and [illegible] of the alkaline liquid into the other [illegible] beaker. Finally, again shake [illegible] proceeding as before, and adding [illegible] beaker. Evaporate the ether care- [illegible] residue in the beaker [illegible] The weight found, multiplied by 10, [illegible]

[illegible]

[illegible] HYDROBROMIDUM

Hyoscine Hydrobromide

[illegible] HBr [illegible] $3H_2O$ [illegible]

[illegible] Hydrobromate, Pharm. 1890]

[illegible] HBr $C_{17}H_{21}NO_4$ [illegible] $3H_2O$] of an alkaloid, chemi- [illegible] obtained from Hyoscyamus and other [illegible] It should be kept in well-stoppered, amber-

[illegible] crystals [illegible] of large size, odorless, [illegible] parts of chloro- [illegible] parts [illegible] at [illegible] 140° F.;

[illegible] litmus paper. [illegible] water [illegible] F.; it [illegible] 23° F. If [illegible] deprived of its water of crystallization, it melts [illegible] When [illegible] leaves no residue. [illegible] yellow [illegible] melts at 197° C. [illegible] crystals [illegible] leaflets and melts [illegible] crystals [illegible] yellow grains [illegible]

[illegible] with 1 Cc. of a [illegible] Hyoscine Hydrobromide [illegible] drops of chlorine water have been cautiously added [illegible] color.

[illegible] drops of nitric acid, and evaporated to dryness [illegible] should yield a violet color upon the addition of [illegible]

Silver nitrate [illegible] solution of the salt, affords a yellowish-white precipitate [illegible] acid, but the washed precipitate is soluble in an excess of [illegible]

Mercuric potassium iodide [illegible] aqueous solutions of the salt acidified with hydrochloric acid [illegible] precipitate.

Mercuric chloride [illegible] solution of phosphotungstic acid give a white precipitate when added to an aqueous solution of the salt.

Picric acid T.S. and platinic chloride [illegible] yield yellow precipitates when added to a concentrated solution of the salt

Sulphuric acid should give but a faint yellow color when added to Hyoscine Hydrobromide (absence of *carbonizable impurities*); nor should any color be developed on the subsequent addition of a drop of nitric acid (absence of *morphine*).

Average dose.— 0.0005 Gm. = 0.5 milligramme ($\frac{1}{128}$ grain).

HYOSCYAMINÆ HYDROBROMIDUM

Hyoscyamine Hydrobromide

$C_{17}H_{23}NO_3.HBr = 367.40$

[HYOSCYAMINÆ HYDROBROMAS, PHARM. 1890]

The hydrobromide [$HBr.C_{17}H_{23}NO_3$] of an alkaloid obtained from Hyoscyamus and other plants of the *Solanaceæ*. It should be kept in amber-colored, well-stoppered vials.

White prismatic crystals having an acrid, nauseous, and bitter taste; deliquescent on exposure to the air.

Very soluble in water; soluble in 2 parts of alcohol, 1600 parts of ether, and in 2.5 parts of chloroform at 25° C. (77° F.).

Its aqueous solution is neutral to litmus paper, and is strongly lævogyrate.

It melts at 151.8° C. (305.3° F.). It leaves no residue on incineration.

Hyoscyamine chloraurate melts at 160° C. (320° F.). Atropine chloraurate melts at 136° C. (276.8° F.). Hyoscine chloraurate melts at 197° C. (386.6° F.). Hyoscyamine picrate melts at 162° C. (323.6° F.). Atropine picrate melts at 175° C. (347° F.).

Silver nitrate T.S., when added to a solution of the salt, yields a yellowish-white precipitate which is insoluble in nitric acid, but the washed precipitate is soluble in an excess of ammonia water.

Gold chloride T.S., when added to a solution of the salt, yields a precipitate which, when recrystallized from a small quantity of boiling water acidulated with hydrochloric acid, is deposited, on cooling, in minute, lustrous, golden-yellow scales (difference from *atropine*).

Platinic chloride T.S. does not form a precipitate with solutions of the salt (difference from *most alkaloids*).

If 0.01 Gm. of the salt be added to 5 drops of nitric acid, and evaporated to dryness in a porcelain dish, the residue should yield a violet color upon the addition of alcoholic potassium hydroxide T.S.

Sulphuric acid should produce but a faint yellow color when added to Hyoscyamine Hydrobromide (absence of *carbonizable impurities*), nor should any color be developed upon the subsequent addition of a drop of nitric acid (absence of *morphine*).

Average dose.— 0.0005 Gm. = 0.5 milligramme ($\frac{1}{128}$ grain).

HYOSCYAMINÆ SULPHAS

Hyoscyamine Sulphate

$(C_{17}H_{23}NO_3)_2.H_2SO_4 = 671.43$

The neutral sulphate [$SO_2(OH)_2.(C_{17}H_{23}NO_3)_2$] of an alkaloid obtained from Hyoscyamus and other plants of the *Solanaceæ*. It should be kept in amber-colored, well-stoppered vials.

White, indistinct crystals, or a white powder; odorless, having a bitter, acrid taste; deliquescent when exposed to the air.

Very soluble in water; soluble in 6.4 parts of alcohol, 2500 parts of ether, and in 2300 parts of chloroform at 25° C. (77° F.).

Its aqueous solution is lævogyrate, and neutral to litmus paper.

It melts at 198.9° C. (390.1° F.). Upon ignition it is rapidly consumed without residue.

Hyoscyamine chloraurate melts at 160° C. (320° F.). Atropine chloraurate melts at 136° C. (276.8° F.). Hyoscine chloraurate melts at 197° C. (386.6° F.). Hyoscyamine picrate melts at 162° C. (323.6° F.). Atropine picrate melts at 175° C. (347° F.).

Barium chloride T.S., when added to an aqueous solution, yields a white precipitate, insoluble in hydrochloric acid.

Gold chloride T.S., when added to an aqueous solution, yields a precipitate which, when recrystallized from a small quantity of boiling water, acidulated with hydrochloric acid, is deposited on cooling in minute, lustrous, golden-yellow scales (difference from *atropine*).

Platinic chloride T.S. does not form a precipitate with solutions of the salt (difference from *most alkaloids*).

If 0.01 Gm. of the salt be added to 5 drops of nitric acid, and evaporated to dryness in a porcelain dish, the residue should yield a violet color upon the addition of alcoholic potassium hydroxide T.S.

Sulphuric acid should produce no color when added to Hyoscyamine Sulphate (absence of *carbonizable impurities*).

Average dose.—0.0005 Gm. = 0.5 milligrammes ($\frac{1}{128}$ grain).

HYOSCYAMUS

Hyoscyamus

The dried leaves and flowering tops of *Hyoscyamus niger* Linné (Fam. *Solanaceæ*), collected from plants of the second year's growth, and yielding, when assayed as directed below, not less than 0.08 percent. of mydriatic alkaloids.

Leaves ovate or ovate-oblong, the lower with a short petiole, the upper sessile, 5 to 25 Cm. long, 2 to 10 Cm. broad, acute, coarsely and angularly toothed or lobed, grayish-green, glandular-hairy, particularly on the lower surface; flowers nearly sessile, with an urn-shaped, unequally 5-toothed calyx and a campanulate, purple-veined corolla, which in the fresh state is yellowish; fruit capsular, 2-celled, and enclosed in the calyx; odor heavy, narcotic; taste somewhat bitter and nauseous. The powder is grayish-green and contains calcium oxalate in single or twin monoclinic prisms about 0.010 Mm. in diameter.

Assay of Hyoscyamus

The method to be employed is identical with that given on page 67, with the exception that *twenty-five grammes* of Hyoscyamus in No. 60 powder are to be used, the quantity of chloroform-ether mixture which is added at first increased from 50 Cc. to 100 Cc., and the product at the end of the assay multiplied by 4 instead of 10.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

INFUSA

Infusions

An ordinary Infusion, the strength of which is not directed by the physician, nor specified by the Pharmacopœia, shall be prepared by the following formula:

Take of

The Substance, coarsely comminuted, *fifty grammes*	50 Gm.
Boiling Water, *one thousand cubic centimeters*	1000 Cc.
Water, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Introduce the Substance into a suitable vessel provided with a cover, pour upon it the Boiling Water, cover the vessel tightly, and let it stand for half an hour in a warm place. Then strain with expression, and pass enough Water through the strainer to make the Infusion measure *one thousand cubic centimeters.*

Caution.—The strength of Infusions of energetic or powerful substances should be specially prescribed by the physician.

INFUSUM DIGITALIS

Infusion of Digitalis

Digitalis, bruised, *fifteen grammes*	15 Gm.
Alcohol, *one hundred cubic centimeters*	100 Cc.
Cinnamon Water, *one hundred and fifty cubic centimeters*	150 Cc.
Boiling Water, *five hundred cubic centimeters*	500 Cc.
Cold Water, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Upon the Digitalis, contained in a suitable vessel, pour the Boiling Water, and allow it to macerate for one hour. Then strain, add the Alcohol and Cinnamon Water to the strained liquid, and pass enough Cold Water through the residue on the strainer to make the product measure *one thousand cubic centimeters.* Mix well.

Average dose.— 8 Cc. (2 fluidrachms).

INFUSUM PRUNI VIRGINIANÆ

Infusion of Wild Cherry

Wild Cherry, in No. 20 powder, *forty grammes*	40 Gm.
Glycerin, *fifty cubic centimeters*	50 Cc.
Water, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Moisten the powder with *sixty cubic centimeters* of Water, and allow it to macerate for one hour; then pack it firmly in a conical glass percolator, and, having placed the Glycerin in the receiving bottle, gradually pour Water upon the powder and continue percolation until the Infusion measures *one thousand cubic centimeters.* Mix well.

Average dose.— 60 Cc. (2 fluidounces).

INFUSUM SENNÆ COMPOSITUM

Compound Infusion of Senna

Senna, *sixty grammes*	60 Gm.
Manna, *one hundred and twenty grammes*	120 Gm.
Magnesium Sulphate, *one hundred and twenty grammes*	120 Gm.
Fennel, bruised, *twenty grammes*	20 Gm.
Boiling Water, *eight hundred cubic centimeters*	800 Cc.
Cold Water, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Upon the Senna, Manna, and Fennel, contained in a suitable vessel, pour the Boiling Water, and allow it to macerate for half an hour. Then strain with expression, dissolve the Magnesium Sulphate in the infusion, and again strain. Lastly, add enough Cold Water through the strainer to make the Infusion measure *one thousand cubic centimeters.*

Average dose.—120 Cc. (4 fluidounces).

IODOFORMUM

Iodoform

$CHI_3 = 390.61$

Triiodomethane, usually obtained by the action of iodine upon alcohol, in the presence of an alkali or alkali carbonate. Iodoform should be kept in well-stoppered bottles, in a cool and dark place.

A fine, lemon-yellow powder or lustrous crystals of the hexagonal system, having a peculiar, very penetrating and persistent odor, and an unpleasant, slightly sweetish, and iodine-like taste.

Soluble in 9391 parts of water, to which it imparts its odor and taste, in 46.7 parts of alcohol, and in 5.2 parts of ether at 25° C. (77° F.); soluble in about 12 parts of boiling alcohol; soluble in chloroform and fixed and volatile oils; slightly soluble in petroleum benzin.

Digest in a porcelain dish 0.1 Gm. of Iodoform with 5 Cc. of an alcoholic solution of potassium hydroxide (1 in 20) until it is dissolved, evaporate to dryness on a water-bath, dissolve the residue in 5 Cc. of distilled water, add 2 Cc. of chloroform and an excess of nitric acid, and shake the mixture; the chloroform will assume an intense violet color.

Its solutions in neutral solvents are neutral to litmus paper.

Iodoform is slightly volatile, even at ordinary temperatures, and in boiling water distils slowly with the vapor of water. At about 115° C. (239° F.) it melts to a brown liquid, and at a higher temperature emits vapors of iodine, leaving behind a carbonaceous mass, which, upon full combustion, should leave not more than 0.2 percent. of residue (limit of *fixed impurities*).

On being dried over sulphuric acid, the loss in weight should not exceed 1 percent.

If 2 Gm. of Iodoform be thoroughly shaken with 10 Cc. of water, the filtrate should be colorless and free from bitter taste (absence of *soluble yellow coloring matters, picric acid*, etc.); it should not affect the color of litmus paper (absence of *free acids*), nor should it be rendered more than faintly opalescent by silver nitrate T.S. (absence of *soluble iodides*).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

IODOLUM

Iodol

$C_4I_4.NH = 566.17$

Tetraiodopyrrol, a derivative of the base pyrrol, obtained by the direct action of iodine upon the base in the presence of alcohol. Iodol should be preserved in amber-colored bottles, protected from light.

A light grayish-brown, crystalline powder, without odor or taste.

It is soluble in about 4900 parts of water, 9 parts of alcohol, 1.5 parts of ether, and 105 parts of chloroform at 25° C. (77° F.); soluble in fixed oils. It is soluble in concentrated sulphuric acid, producing a green solution gradually changing to brown.

When heated to 100° C. (212° F.) it remains unchanged, but at a temperature of 140° to 150° C. (284° to 302° F.) it is decomposed with the liberation of violet iodine vapors. When ignited it should leave not more than 0.1 percent. of residue (limit of *inorganic impurities*).

If 0.5 Gm. of Iodol be shaken with 100 Cc. of water and filtered, the filtrate should not be made more than slightly opalescent by silver nitrate T.S. (absence of *hydriodic acid* or soluble metallic *iodides*).

If 0.5 Gm. of Iodol be shaken with 100 Cc. of water and filtered, the filtrate should not communicate more than a light yellowish tinge to chloroform (absence of appreciable amount of *free iodine*).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

IODUM

Iodine

I = 125.90

It should contain not less than 99 percent. of pure Iodine, and be kept in glass-stoppered bottles, in a cool place.

Heavy, bluish-black, dry and friable, rhombic plates, having a metallic lustre, a distinctive odor, and a sharp and acrid taste.

Specific gravity: 4.948 at 17° C. (62.6° F.).

Iodine imparts a deep brown, evanescent stain to the skin, and slowly destroys vegetable colors.

Soluble in about 5000 parts of water, and in 10 parts of alcohol at 25° C. (77° F.); freely soluble in ether, chloroform, or carbon disulphide; its solution in alcohol or in an aqueous solution of potassium iodide has a reddish color; its solution in chloroform or carbon disulphide has a violet color.

It volatilizes slowly at ordinary temperatures. When heated to about 114° C. (237.2° F.), it fuses, and is gradually dissipated in the form of a purple vapor, leaving no residue.

With starch T.S. a dark blue color is produced.

A solution of iodine in chloroform should be perfectly clear and limpid (absence of *moisture*).

To determine the presence of cyanogen, chlorine, or bromine, proceed as follows:

Triturate 0.5 Gm. of finely powdered Iodine with 20 Cc. of water, and filter the solution. To one-half of this solution, in a test-tube, carefully add tenth-normal sodium thiosulphate V.S., until the solution is just decolorized. Then add a few drops of ferrous sulphate T.S., and subsequently a little sodium hydroxide T.S., and heat the mixture gently. On now adding a slight excess of hydrochloric acid, the liquid should not assume a blue color (absence of *iodine cyanide*).

To the other half of the aqueous filtrate, in a test-tube, add a slight excess of silver nitrate T.S., shake the liquid actively, allow the precipitate to subside, and, having poured off the clear, supernatant liquid completely, shake the precipitate with a mixture of 1 Cc. of ammonia water and 9 Cc. of water, and filter. Upon the addition of a slight excess of nitric acid to the filtrate, not more than a slight opalescence should make its appearance (limit of *chlorine* or *bromine*).

Assay

Place about 0.5 Gm. of Iodine in a tightly stoppered weighing-bottle and weigh accurately; add 1 Gm. of potassium iodide and dissolve in 50 Cc. of water, then add tenth-normal sodium thiosulphate V.S. until the liquid is decolorized. The number of Cc. of tenth-normal sodium thiosulphate V.S. consumed, when multiplied by 1.259, and divided by the weight of the Iodine taken, gives the percentage of pure Iodine present.

Average dose.—0.005 Gm. = 5 milligrammes ($\frac{1}{10}$ grain).

IPECACUANHA

Ipecac

The dried root, to which may be attached a portion of the stem not exceeding 7 Cm. in length, of *Cephaëlis Ipecacuanha* (Brotero) A. Richard (Fam. *Rubiaceæ*), known commercially as *Rio*, *Brazilian*, or *Para ipecac*, or the corresponding portion of *C. acuminata* Karsten, known commercially as *Carthagena ipecac*, yielding, when assayed by the process given below, not less than 1.75 percent. of ipecac alkaloids.

Rio Ipecac.—In pieces of irregular length, rarely exceeding 25 Cm.; stem-portion 2 to 3 Mm. thick, light gray-brown, cylindrical and smoothish; root-portion usually red-brown, occasionally blackish-brown, rarely gray-brown, 3 to 6 Mm. thick, curved and sharply flexuous, nearly free from rootlets, occasionally branched, closely annulated with thickened, incomplete rings, and usually exhibiting transverse fissures, with vertical sides, through the bark; fracture short, the very thick, easily separable bark whitish, usually resinous, the thin, tough wood yellowish-white, without vessels; odor very slight, peculiar, the dust sternutatory; taste bitter and nauseous, somewhat acrid.

Carthagena Ipecac.—Similar to Rio Ipecac, but about one-half thicker, dull gray externally, with thinner, merging annulæ, and the fractured surface of the bark gray.

Assay of Ipecac

Ipecac, in No. 80 powder, *fifteen grammes*	15 Gm.
Ether,	
Chloroform,	
Ammonia Water,	
Distilled Water,	
Normal Sulphuric Acid V.S.,	
Tenth-normal Sulphuric Acid V.S.,	
Fiftieth-normal Potassium Hydroxide V.S.,	
Cochineal T.S., each, *a sufficient quantity.*	

Introduce the Ipecac into an Erlenmeyer flask of 250 Cc. capacity, add 115 Cc. of ether and 35 Cc. of Chloroform, shake the flask during five minutes, and then add 3 Cc. of ammonia water and again shake the flask at intervals during half an hour. Now add 10 Cc. of distilled water, shake the liquid until the powder collects in masses, and pour off 100 Cc. of the clear ethereal solution into a measuring cylinder. Transfer the latter to a separator, add 10 Cc. of normal sulphuric acid V.S. and 10 Cc. of distilled water. Shake the separator moderately during two minutes, and when the liquids have separated, draw off the lower acid solution into a second separator. Repeat the shaking out of the ether-solution with 3 Cc. of normal sulphuric acid V.S. and 5 Cc. of distilled water, drawing the acid solution into the second separator. Repeat the shaking out again, using 10 Cc. of distilled water, and add the aqueous solution to the second separator. Reject the ether in the first separator, introduce a small piece of red litmus paper into the second separator, add enough ammonia water to render the liquid alkaline, and 25 Cc. of ether, and then shake the separator vigorously during one minute; draw off the alkaline aqueous liquid into another separator, and transfer the ether-solution to a flask. Add 20 Cc. of ether to the alkaline liquid in the separator, shake it for one minute, and, having allowed the liquids to separate, draw off the alkaline liquid into the other separator, and transfer the ether-solution to the flask. Again shake out the alkaline liquid with 10 Cc. of ether, and, when the fluids have separated, reject the alkaline liquid and add the ether-solution to the liquid in the flask. Distil the ether from the flask with the aid of a water-bath, and dissolve the alkaloidal residue in 12 Cc. of tenth-normal sulphuric acid V.S., warming it gently on a water-bath if necessary. Then add five drops of cochineal T.S. and titrate with fiftieth-normal potassium hydroxide V.S. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from 12 (the 12 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.0238, and this product by 10, which will give the percentage of alkaloids in the Ipecac.

Average dose.— { Expectorant, 0.065 Gm. = 65 milligrammes (1 grain).
Emetic, 1 Gm. (15 grains).

JALAPA

Jalap

The dried tuberous root of *Exogonium Purga* (Wenderoth) Bentham (Fam. *Convolvulaceæ*), yielding, when assayed by the process given below, not less than 7 percent. of total resin, of which not more than 15 percent. should be soluble in ether.

Napiform, pyriform or oblong, 3 to 8 Cm. long and 1 to 5 Cm. in diameter, the large roots often incised, more or less wrinkled, dark brown, with lighter colored spots, and short transverse ridges; hard, compact, internally dark brown, with numerous concentric circles composed of small resin cells; fracture resinous, lustrous, not fibrous; odor slight, but peculiar, smoky and sweetish; taste sweetish and acrid.

Assay of Jalap

Jalap, in No 60 powder, *ten grammes* . . . . 10 Gm.
Ether,
Alcohol,
Chloroform,
Distilled Water, each, *a sufficient quantity*.

Insert a pledget of purified cotton in the neck of a funnel or small glass percolator, introduce the powdered Jalap and pour ether upon it, keeping the funnel or percolator well covered, until 50 Cc. of percolate have been obtained.

Transfer the percolate to a tared beaker, evaporate the ether by means of a water-bath, and weigh the residue. The weight multiplied by ten will give the percentage of ether-soluble resin in the Jalap. Continue the percolation of the powder (which has been exhausted by the ether) with alcohol, until 100 Cc. of percolate have been obtained. Measure 20 Cc. of this percolate into a separator, add 20 Cc. of chloroform, mix the liquids and then add 20 Cc. of distilled water, and shake the separator thoroughly for one minute. When the liquids have completely separated, draw off the chloroform into a tared beaker, wash the separator with 5 Cc. of chloroform, and add the washings to the tared beaker. Evaporate the chloroform with the aid of a water-bath, and then dry the residue to a constant weight. This weight multiplied by fifty will give the percentage of resin insoluble in ether in the Jalap. Add to this the percentage of ether-soluble resin already determined, and the result will be the percentage of total resin contained in the Jalap.

Average dose.— 1 Gm. (15 grains).

KAOLINUM

Kaolin

A native aluminum silicate, consisting chiefly of the pure silicate [$H_2Al_2Si_2O_8 + H_2O = 257.12$], powdered and freed from gritty particles by elutriation.

A soft, white or yellowish-white powder, or in lumps, having an earthy or clay-like taste, insoluble in water, and in cold dilute solutions of the acids and alkali hydroxides.

When moistened with water, Kaolin assumes a darker color and develops a marked clay-like odor.

If 1 Gm. of Kaolin be mixed with 10 Cc. of water and 5 Cc. of sulphuric acid in a porcelain dish, no effervescence should occur, and if the mixture be evaporated until the excess of water has been removed, and further heated until dense white fumes of sulphuric acid anhydride appear, then after cooling and adding 20 Cc. of water, boiling for a few minutes and filtering, there should remain on the filter a gray insoluble residue of *impure silica*.

If to one-half of the filtrate ammonia water be added, a gelatinous precipitate of *aluminum hydroxide*, insoluble in excess, should be obtained.

If to the remaining half of the filtrate, sodium hydroxide T.S. be added, it should yield a gelatinous precipitate which is almost or completely soluble in an excess of the reagent.

If 2 Gm. of Kaolin be rubbed in a mortar with 10 Cc. of water, the mixture should not acquire more than a slight reddish tint on the addition of 0.5 Gm. of sodium salicylate (absence of more than traces of *iron*).

If Kaolin be ignited at a red heat, it should leave not less than 85 percent. of non-volatile residue.

KINO

Kino

The inspissated juice of *Pterocarpus Marsupium* Roxburgh (Fam. *Leguminosæ*).

Small, angular, dark red, shining pieces, brittle, in thin layers ruby-red and transparent; inodorous, very astringent, and sweetish, tingeing the saliva deep-red.

Soluble in alcohol, nearly insoluble in ether, and slowly soluble in cold water.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

KRAMERIA

Krameria

The dried root of *Krameria triandra* Ruiz and Pavon (Peruvian Krameria), *Krameria Ixina* Linné (Savanilla Krameria) or of *Krameria argentea* Martius (Para or Brazilian Krameria) (Fam. *Krameriaceæ*).

Peruvian Krameria.—Root-branches several or many, usually attached to a short, hard, and woody tap-root, which is 1.5 to 4 Cm. thick, roughly fissured, and supporting a knotty, several- to many-headed crown; roots of variable length, rarely exceeding 50 Cm. and usually less than 1 Cm. thick, cylindrical, flexuous or wavy, very flexible; externally light red-brown, more or less marked with dark, scaly patches, especially upward, otherwise smoothish, devoid of transverse fissures; fracture tough and splintery, the pinkish-brown bark occupying less than one-third of the radius, the wood yellowish or pinkish-white, finely radiate; inodorous and of a very astringent taste.

Savanilla and Brazilian Kramerias.—Branches usually occurring detached from the tap-root and crown, less flexuous than those last described, externally of a purple-brown or chocolate brown, and with numerous transverse cracks or fissures; fracture less tough than that of Peruvian Krameria, the bark and wood both darker, the bark occupying two-fifths or more of the radius, the taste more astringent than that of Peruvian Krameria.

Average dose.—1 Gm. (15 grains).

LACTUCARIUM

Lactucarium

The concrete milk-juice of *Lactuca virosa* Linné (Fam. *Compositæ*).

Usually in quarter sections of hemispherical masses, or in irregular, angular pieces; externally dull reddish-brown or grayish-brown; internally light brown or yellowish, the cut surface having a waxy lustre and somewhat porous; odor distinct, opium-like; taste strongly bitter.

Lactucarium is partly soluble in alcohol and in ether. When triturated with water it yields a turbid mixture. When boiled with water it softens and yields a brownish-colored liquid which, after cooling, is not colored blue by iodine T.S.

Average dose.—1 Gm. (15 grains).

LAPPA

Lappa

The dried root of *Arctium Lappa* Linné, or of other species of *Arctium* (Fam. *Compositæ*), collected from plants of the first year's growth.

Nearly simple, fusiform, of variable length, 5 to 20 Mm. in diameter near the crown; frequently split or in broken pieces; externally grayish-brown, longitudinally wrinkled, the crown somewhat annulate, sometimes surmounted by a woolly tuft of leaf remains; fracture somewhat horny; a dark cambium separating the thick brownish bark from the yellowish porous and radiate wood, centrally hollow or containing a white pith-like tissue; odor slight; taste mucilaginous, sweetish, and slightly bitter.

Average dose.—2 Gm. (30 grains).

LEPTANDRA

Leptandra

The dried rhizome and roots of *Veronica virginica* Linné (Fam. *Scrophulariaceæ*).

Rhizome of horizontal or oblique growth, somewhat bent and branched, from 4 to 15 Cm. long and 3 to 8 Mm. in diameter; externally gray-brown to blackish-brown, with cup-shaped scars on the upper side; annulate, the inferior and lateral surfaces with coarse roots and root-scars; fracture tough and woody, branches readily separable from the main rhizome; internally, bark dark brown, 0.3 to 1 Mm. thick, wood hard, yellowish, pith large, purplish-brown; roots slender, longitudinally wrinkled, fragile; odor slight; taste bitter, slightly acrid.

Average dose.—1 Gm. (15 grains).

LIMONIS CORTEX

Lemon Peel

The recently separated outer rind of the ripe fruit of *Citrus Limonum* Risso (Fam. *Rutaceæ*).

Outer surface lemon-yellow, the tissue beneath containing numerous large oil reservoirs; odor highly fragrant; taste pungently aromatic.

LIMONIS SUCCUS

Lemon Juice

The freshly expressed juice of the ripe fruit of *Citrus Limonum* Risso (Fam. *Rutaceæ*).

A slightly turbid, yellowish liquid, having the odor of lemon; taste acid and often slightly bitter.

Specific gravity: 1.030 to 1.040 at 25° C. (77° F.).

It reddens blue litmus paper and should contain from 7 to 9 percent. of citric acid.

If a few drops of barium chloride T.S. be added to filtered Lemon Juice, no turbidity or white precipitate should be produced (absence of *sulphuric acid* or *sulphates*).

If an equal volume of sulphuric acid containing a few drops of alcohol be added to Lemon Juice, and the liquid heated, no odor of acetic ether should be developed (absence of *acetic acid*).

Upon the addition of solution of potassium acetate (1 in 3) and alcohol in excess, no white crystalline precipitate should form after allowing the liquid to stand fifteen minutes (absence of *tartaric acid*).

At least 10 Cc. of normal potassium hydroxide V.S. should be required to neutralize 10 Cc. of Lemon Juice, phenolphthalein T.S. being used as indicator.

Average dose.—30 Cc. (1 fluidounce).

LINIMENTUM AMMONIÆ

Ammonia Liniment

Ammonia Water, *three hundred and fifty cubic centimeters*	350 Cc.
Alcohol, *fifty cubic centimeters*	50 Cc.
Cotton Seed Oil, *five hundred and seventy cubic centimeters*	570 Cc.
Oleic Acid, *thirty cubic centimeters*	30 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them by agitation in a bottle, which should be well-stoppered. This Liniment should be freshly prepared when wanted.

LINIMENTUM BELLADONNÆ

Belladonna Liniment

Camphor, *fifty grammes*	50 Gm.
Fluidextract of Belladonna Root, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Dissolve the Camphor in about *eight hundred cubic centimeters* of the Fluidextract, and then add enough of the latter to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

LINIMENTUM CALCIS

Lime Liniment

Lime Water, *five hundred cubic centimeters*	500 Cc.
Linseed Oil, *five hundred cubic centimeters*	500 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them by agitation.

LINIMENTUM CAMPHORÆ

Camphor Liniment

Camphor, in coarse powder, *two hundred grammes*	200 Gm.
Cotton Seed Oil, *eight hundred grammes*	800 Gm.
To make *one thousand grammes*	1000 Gm.

Introduce the Camphor and the Cotton Seed Oil into a suitable flask, and apply a gentle heat, by means of a water-bath, loosely stoppering the flask during the operation. Agitate the flask occasionally, until the Camphor is dissolved.

LINIMENTUM CHLOROFORMI

Chloroform Liniment

Chloroform, *three hundred cubic centimeters*	300 Cc.
Soap Liniment, *seven hundred cubic centimeters*	700 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them by agitation.

LINIMENTUM SAPONIS

Soap Liniment

Soap, dried and granulated, *sixty grammes*	60 Gm.
Camphor, in small pieces, *forty-five grammes*	45 Gm.
Oil of Rosemary, *ten cubic centimeters*	10 Cc.
Alcohol, *seven hundred and twenty-five cubic centimeters*	725 Cc.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Add the Soap to *two hundred cubic centimeters* of boiling Water, heat the mixture on a water-bath until a clear gelatinous mass results. Mix this, while yet warm, with *five hundred cubic centimeters* of Alcohol, and stir it until solution is effected. Dissolve the Camphor and Oil of Rosemary in *two hundred and twenty-five cubic centimeters* of the Alcohol by agitation in a bottle; add this solution to the warm Soap mixture; mix thoroughly, and, if necessary, add enough Water to make the product measure *one thousand cubic centimeters.* Set it aside in a cool place for twenty-four hours, then filter.

LINIMENTUM SAPONIS MOLLIS

Liniment of Soft Soap

Soft Soap, *six hundred and fifty grammes*	650 Gm.
Oil of Lavender Flowers, *twenty cubic centimeters*	20 Cc.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Oil of Lavender Flowers with *three hundred cubic centimeters* of Alcohol, dissolve in this the Soft Soap by stirring or agitation, and set the solution aside for twenty-four hours. Then filter it through paper, adding sufficient Alcohol to make the product measure *one thousand cubic centimeters.*

LINIMENTUM TEREBINTHINÆ

Turpentine Liniment

Rosin Cerate, *six hundred and fifty grammes*	650 Gm.
Oil of Turpentine, *three hundred and fifty grammes*	350 Gm.
To make *one thousand grammes*	1000 Gm.

Dissolve the Rosin Cerate, previously melted in a dish on a water-bath, in the Oil of Turpentine, and mix them thoroughly.

LINUM

Linseed Flaxseed

The ripe seed of *Linum usitatissimum* Linné (Fam. *Linaceæ*).

Ovate or oblong-lanceolate, flattened, 4 or 5 Mm. long, obliquely pointed at one end; externally chestnut-brown, very smooth and glossy, covered with a transparent, mucilaginous outer wall which swells in water; embryo whitish or greenish, with two large, plano-convex and oily cotyledons, embedded in a thin perisperm; odor slight; taste mucilaginous, oily.

Ground Linseed (Linseed Meal or Flaxseed Meal) should be recently prepared and free from unpleasant or rancid odor. It is a grayish-yellow powder containing brownish fragments, and when exhausted by carbon disulphide should yield not less than 30 percent. of a fixed oil, all of which is saponifiable.

If 0.1 Gm. of ground Linseed be mixed with 20 Cc. of water and the mixture heated to boiling, then cooled and diluted with cold water to 100 Cc., the addition of 0.5 Cc. of iodine T.S. should not produce more than a pale blue color (limit of *starch*).

LIQUOR ACIDI ARSENOSI

Solution of Arsenous Acid

An aqueous solution, which should contain Arsenous Acid corresponding in amount to 1 percent. of arsenic trioxide [$As_2O_3 = 196.44$].

Arsenic Trioxide, *ten grammes*	10 Gm.
Diluted Hydrochloric Acid, *fifty grammes*	50 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand grammes*	1000 Gm.

Mix the Diluted Hydrochloric Acid with *two hundred and fifty grammes* of Distilled Water, in a tared porcelain dish, add the Arsenic Trioxide, and boil the mixture until the Arsenic Trioxide is dissolved. Then add enough Distilled Water to make the product weigh *one thousand grammes.* Filter through paper.

A clear, colorless liquid, odorless, having an acidulous taste and an acid reaction.

If to 24.6 Gm. of Solution of Arsenous Acid about 2 Gm. of sodium bicarbonate and 100 Cc. of water be added, not less than 50 Cc. of tenth-normal iodine V.S. should be required to produce a permanent yellow tint (corresponding to 1 Gm. of arsenic trioxide in 100 Gm. of the Solution).

Average dose.—0.2 Cc. (3 minims).

LIQUOR AMMONII ACETATIS

Solution of Ammonium Acetate

An aqueous solution which should contain not less than 7 percent. of Ammonium Acetate [$CH_3.COONH_4 = 76.51$], with small amounts of acetic and carbonic acids.

Ammonium Carbonate, *five grammes*	5 Gm.
Diluted Acetic Acid, *one hundred cubic centimeters*	100 Cc.

Add the Ammonium Carbonate (which should be in translucent pieces, free from white, pulverulent bicarbonate) gradually to the cold Diluted Acetic Acid, and stir until it is dissolved.

This preparation should be freshly made when wanted.

A clear, colorless liquid, free from empyreuma, of a mildly saline, acidulous taste, and an acid reaction.

It is wholly volatilized by heat.

When Solution of Ammonium Acetate is heated with potassium hydroxide T.S., ammonia is evolved.

If to 5 Cc. of the Solution 1 Cc. each of sulphuric acid and alcohol be added, and the mixture boiled, the odor of acetic ether will be developed.

Average dose.—16 Cc. (4 fluidrachms).

LIQUOR ANTISEPTICUS

Antiseptic Solution

Boric Acid, *twenty grammes*	20.00 Gm.
Benzoic Acid, *one gramme*	1.00 Gm.
Thymol, *one gramme*	1.00 Gm.
Eucalyptol, *one-fourth cubic centimeter*	0.25 Cc.
Oil of Peppermint, *one-half cubic centimeter*	0.50 Cc.
Oil of Gaultheria, *one-fourth cubic centimeter*	0.25 Cc.
Oil of Thyme, *one-tenth cubic centimeter*	0.10 Cc.
Alcohol, *two hundred and fifty cubic centimeters*	250.00 Cc.
Purified Talc, *twenty grammes*	20.00 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Boric Acid in *seven hundred cubic centimeters* of Water, and the Benzoic Acid in *one hundred and fifty cubic centimeters* of Alcohol, and pour the aqueous solution into the alcoholic solution. Then dissolve, in a mortar, the Thymol in the Eucalyptol and Oils of Peppermint, Gaultheria, and Thyme; thoroughly incorporate the Purified Talc, and add, with constant trituration, the solution first prepared. Allow the mixture to stand, with occasional agitation, during forty-eight hours, filter, add *one hundred cubic centimeters* of

Alcohol to the clear filtrate, and a sufficient quantity of Water to make the finished product measure *one thousand cubic centimeters.*

Average dose.— 4 Cc. (1 fluidrachm).

LIQUOR ARSENI ET HYDRARGYRI IODIDI

Solution of Arsenous and Mercuric Iodides

An aqueous solution, which should contain not less than 1 percent. of Arsenous Iodide and 1 percent. of Mercuric Iodide.

Arsenous Iodide, *ten grammes*	10 Gm.
Red Mercuric Iodide, *ten grammes*	10 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand grammes* . .	1000 Gm.

Rub the Arsenous Iodide and Red Mercuric Iodide together in a mortar, add *one hundred and fifty cubic centimeters* of Distilled Water, and continue the trituration until solution is effected. Filter the solution, and pass sufficient Distilled Water through the filter to make the product weigh *one thousand grammes.* Mix thoroughly.

A clear, colorless or pale yellowish liquid, without odor, and having a disagreeable metallic taste.

Average dose.— 0.1 Cc. (1½ minims).

LIQUOR CALCIS

Lime Water Solution of Calcium Hydroxide

A saturated aqueous solution, which should contain not less than 0.14 percent. of pure Calcium Hydroxide [$Ca(OH)_2 = 73.56$].

The percentage of Calcium Hydroxide varies with the temperature at which the saturated solution is prepared, being about 0.17 percent. at 15° C. (59° F.), the percentage diminishing as the temperature rises.

Lime, *twelve grammes*	12 Gm.
Distilled Water, *a sufficient quantity.*	

Slake the Lime by the very gradual addition of *four hundred cubic centimeters* of Distilled Water, and agitate occasionally during half an hour. Allow the suspended particles to subside, decant the supernatant liquid and reject it. Then add to the residue *thirty-six hundred* *cubic centimeters* of Distilled Water, agitate thoroughly, let the mixture stand for twenty-four hours, agitate again, then let the coarser particles of solid matter subside, and pour the liquid, holding the undissolved calcium hydroxide in suspension, into a glass-stoppered bottle. From time to time shake the bottle, so as to keep the solution saturated.

Pour off the clear liquid when required for use.

A clear, colorless liquid without odor, and having an alkaline taste.

It absorbs carbon dioxide from the air, a pellicle of calcium carbonate forming on the surface of the liquid.

On being heated it becomes turbid, due to the separation of calcium hydroxide which redissolves when the liquid is cooled.

It gives a strongly alkaline reaction with red litmus paper.

The alkaline reaction of the Solution should entirely disappear, after it has been saturated with carbon dioxide, and subsequently boiled (absence of *alkalies* and their *carbonates*).

In other respects it should conform to the reactions and tests for an aqueous solution of lime given under *Calx*.

Fifty Cc. should require, for complete neutralization, not less than 19 Cc. of tenth-normal sulphuric acid V.S. (corresponding to about 0.14 percent. of calcium hydroxide), phenolphthalein T.S. being used as indicator.

Average dose.— 16 Cc. (4 fluidrachms).

LIQUOR CHLORI COMPOSITUS

Compound Solution of Chlorine   Chlorine Water

[To replace AQUA CHLORI, PHARM. 1890]

An aqueous solution, containing, when freshly prepared, about 0.4 percent. of Chlorine [Cl = 35.18], with some oxides of chlorine and potassium chloride.

Potassium Chlorate, granulated, *five grammes*	5 Gm.
Hydrochloric Acid, *eighteen cubic centimeters*	18 Cc.
Distilled Water, *a sufficient quantity,*	
To make about *one thousand cubic centimeters* . .	1000 Cc.

Add the Hydrochloric Acid, diluted with *twenty cubic centimeters* of Distilled Water, to the Potassium Chlorate contained in a flask of the capacity of about *two thousand cubic centimeters.* Insert in the flask a stopper perforated to admit a funnel of the capacity of about *one hundred cubic centimeters* containing about *ten grammes* of purified cotton well wetted with cold water; place the flask on a water-bath containing boiling water, for a period of from two to three minutes; when the flask is completely filled with a greenish-yellow gas, remove it from the bath and add cold Distilled Water through the cotton in the funnel, in two separate portions of *five hundred cubic centimeters* each. After the addition of each separate portion of cold Distilled

Water, stopper the flask securely, invert, and thoroughly agitate the contents.

This solution should be freshly made when wanted.

Average dose.—4 Cc. (1 fluidrachm).

LIQUOR CRESOLIS COMPOSITUS

Compound Solution of Cresol

Cresol, *five hundred grammes*	**500 Gm.**
Linseed Oil, *three hundred and fifty grammes*	**350 Gm.**
Potassium Hydroxide, *eighty grammes*	**80 Gm.**
Water, *a sufficient quantity,*	
To make *one thousand grammes* . .	**1000 Gm.**

Dissolve the Potassium Hydroxide in *fifty grammes* of Water in a tared dish, add the Linseed Oil, and mix thoroughly. Then add the Cresol and stir, until a clear solution is produced, and finally sufficient Water to make the finished product weigh *one thousand grammes.*

LIQUOR FERRI CHLORIDI

Solution of Ferric Chloride

An aqueous solution of Ferric Chloride, which should contain not less than 29 percent. of the anhydrous salt [$FeCl_3 = 161.04$], corresponding to 10 percent. of metallic iron.

Iron, in the form of fine, bright wire, and cut into small pieces, *one hundred and twenty-five grammes*	**125 Gm.**
Hydrochloric Acid, *six hundred and eighty grammes*	**680 Gm.**
Nitric Acid,	
Distilled Water, each, *a sufficient quantity,*	
To make *one thousand grammes* . .	**1000 Gm.**

Introduce the Iron Wire into a flask having a capacity of about *two thousand cubic centimeters,* pour upon it a mixture of *four hundred and twenty grammes* of Hydrochloric Acid and *two hundred and fifty cubic centimeters* of Distilled Water, and heat upon a water-bath for not less than one hour and fifteen minutes, or until effervescence ceases; then boil the liquid, filter it through paper, and, having rinsed the flask and Iron Wire with a little hot Distilled Water, pass the rinsings through the filter. To the filtered liquid add *two hundred and twenty grammes* of Hydrochloric Acid, add the mixture slowly and gradually, in a stream, to *sixty-five grammes* of Nitric Acid contained in a capacious porcelain vessel, and warm gently. After effervescence ceases, apply heat, by means of a sand-bath, stirring occasionally, until the liquid is free from Nitric Acid. If the solution has acquired a black color, continue the addition of Nitric Acid, drop by drop, until red fumes are no longer evolved and the solution assumes a clear reddish-brown color. Finally, add the remaining *forty grammes* of Hydrochloric Acid and enough Distilled Water to make the Solution weigh *one thousand grammes.*

A reddish-brown liquid, having a faint odor of hydrochloric acid, an acid, strongly styptic taste, and an acid reaction.

Specific gravity: from 1.280 to 1.290 at 25° C. (77° F.).

The diluted Solution yields a brownish-red precipitate with ammonia water, a blue one with potassium ferrocyanide T.S., and a white one, insoluble in nitric acid, with silver nitrate T.S.

If the iron be completely precipitated from a portion of the Solution by an excess of ammonia water, the filtrate should be colorless, and should not yield a precipitate with hydrogen sulphide T.S. (absence of *zinc* or *copper*); nor should it leave a fixed residue on evaporation and gentle ignition (absence of *salts of the fixed alkalies*).

On adding a clear crystal of ferrous sulphate to a cooled mixture of equal volumes of concentrated sulphuric acid and a diluted portion of the Solution (1 in 10), the crystal should not become colored brown, nor should a brownish-black color develop around it (absence of *nitric acid*).

If to a diluted portion of the Solution (about 1 in 20) a few drops of freshly prepared potassium ferricyanide T.S. be added, a pure brown color should be produced, which should not at once turn green or greenish-blue (absence of *ferrous salts*).

If to 3 drops of Solution of Ferric Chloride, 10 Cc. of tenth-normal sodium thiosulphate V.S. be added, and then slowly heated to boiling, no brownish-red precipitate of ferric hydroxide should separate (absence of *oxychloride*).

If 10 Gm. of the Solution be diluted to measure 100 Cc., and 11.1 Cc. of this be introduced into a glass-stoppered bottle (having a capacity of about 100 Cc.), together with 10 Cc. of water and 2 Cc. of hydrochloric acid, and, after the addition of 1 Gm. of potassium iodide, the mixture be kept for half an hour at a temperature of 40° C. (104° F.), then cooled, and mixed with a few drops of starch T.S., it should require not less than 20 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the blue or greenish color of the liquid (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 0.5 percent. of metallic iron).

Average dose.— 0.1 Cc. ($1\frac{1}{2}$ minims).

LIQUOR FERRI ET AMMONII ACETATIS

Solution of Iron and Ammonium Acetate

Tincture of Ferric Chloride, *forty cubic centimeters*	40 Cc.
Diluted Acetic Acid, *sixty cubic centimeters*	60 Cc.
Solution of Ammonium Acetate, *five hundred cubic centimeters*	500 Cc.
A **Elixir,** *one hundred and twenty cubic centimeters*	120 Cc.
hundred and twenty cubic centimeters	120 Cc.
ient quantity,	
To make *one thousand cubic centimeters*	1000 Cc.

To the Solution of Ammonium Acetate (which should not be alkaline) add, successively, the Diluted Acetic Acid, the Tincture of Ferric Chloride, the Aromatic Elixir, and the Glycerin, and lastly, enough Water to make the product measure *one thousand cubic centimeters.*

This preparation should be freshly made when wanted.

Average dose.— 16 Cc. (4 fluidrachms).

LIQUOR FERRI SUBSULPHATIS

Solution of Ferric Subsulphate

An aqueous solution of variable chemical composition, containing an amount of basic ferric sulphate corresponding to not less than 13.57 percent. of metallic iron.

Ferrous Sulphate, in clear crystals, *six hundred and seventy-five grammes*	**675 Gm.**
Sulphuric Acid, *sixty-five grammes*	**65 Gm.**
Nitric Acid,	
Distilled Water, each, *a sufficient quantity,*	
To make *one thousand grammes*	**1000 Gm.**

Add the Sulphuric Acid to *five hundred cubic centimeters* of Distilled Water in a capacious porcelain dish, heat the mixture to nearly 100° C. (212° F.), then add *seventy grammes* of Nitric Acid, and mix well. Divide the Ferrous Sulphate, coarsely powdered, into four equal portions, and add these portions, one at a time, to the hot liquid, stirring after each addition until effervescence ceases. If, after the Ferrous Sulphate has been dissolved, the solution is of a black color, add Nitric Acid, a few drops at a time, with heating and stirring, until it no longer causes red fumes to be evolved; then boil the Solution until it assumes a ruby-red color and is free from nitric acid. Lastly, add enough Distilled Water to make the product weigh *one thousand grammes.* Filter if necessary. Keep it in well-stoppered bottles, in a moderately warm place (not under 22° C. or 71.6° F.), protected from light.

This solution sometimes crystallizes, forming a semi-solid, whitish mass. When this occurs, the application of a gentle heat to the bottle will restore the liquid condition.

A dark reddish-brown liquid, odorless or nearly so, of an acid, strongly styptic taste, and an acid reaction.

Specific gravity: about 1.548 at 25° C. (77° F.).

Miscible with water and alcohol, in all proportions, without decomposition.

The diluted Solution yields a brownish-red precipitate with ammonia water, a blue one with potassium ferrocyanide T.S., and a white one, insoluble in hydrochloric acid, with barium chloride T.S.

On slowly mixing 2 volumes of the Solution with 1 volume of concentrated sulphuric acid, in a beaker, a semi-solid white mass should separate on standing (difference from *tersulphate*).

On adding a clear crystal of ferrous sulphate to a cooled mixture of equal volumes of concentrated sulphuric acid and a diluted portion of the Solution (about 1 in 10), the crystal should not become brown, nor should a brownish-black color develop around it (absence of *nitric acid*).

If to a diluted portion of the Solution (1 in 20), a few drops of freshly prepared potassium ferricyanide T.S. be added, a pure brown color should be produced; it should not at once turn green or greenish-blue (absence of *ferrous salt*).

If 10 Gm. of the Solution be diluted to measure 100 Cc., and 11.1 Cc. of this be introduced into a glass-stoppered bottle (having a capacity of about 100 Cc.), with 10 Cc. of water and 2 Cc. of hydrochloric acid, and, after the addition of 1 Gm. of potassium iodide, the mixture be kept for half an hour at the temperature of 40° C. (104° F.), then cooled, and mixed with a few drops of starch T.S., it should require not less than 27.2 (27.15) Cc. of tenth-normal sodium thiosulphate V.S. to discharge the blue or greenish color of the liquid (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 0.5 percent. of metallic iron).

Average dose.— 0.2 Cc. (3 minims).

LIQUOR FERRI TERSULPHATIS

Solution of Ferric Sulphate

An aqueous solution, which should contain about 36 percent. of normal Ferric Sulphate [$Fe_2(SO_2.O_2)_3 = 397.05$], corresponding to not less than 10 percent. of metallic iron.

Ferrous Sulphate, in clear crystals, *five hundred grammes* . .	500 Gm.
Sulphuric Acid, *ninety-six grammes*	96 Gm.
Nitric Acid,	
Distilled Water, each, *a sufficient quantity*,	
To make *one thousand grammes* . .	1000 Gm.

Add the Sulphuric Acid to about *two hundred and fifty cubic centimeters* of Distilled Water in a capacious porcelain dish, heat the mixture to nearly 100° C. (212° F.), then add *fifty-six grammes* of Nitric Acid, and mix well. Divide the Ferrous Sulphate, coarsely powdered, into four equal portions, and add these portions, one at a time, to the hot liquid, stirring after each addition until effervescence ceases. When all of the Ferrous Sulphate is dissolved, if the solution has acquired a black color, add Nitric Acid, a few drops at a time, heating and stirring until it no longer causes red fumes to be evolved, and the Solution assumes a clear reddish-brown color; then boil the liquid until it is free from nitric acid. Lastly, add enough Distilled Water to make the product weigh *one thousand grammes*. Filter, if necessary.

A dark reddish-brown liquid, almost odorless, having an acid, strongly styptic taste, and an acid reaction.

Specific gravity: from 1.430 to 1.450 at 25° C. (77° F.).

Miscible with water and alcohol, in all proportions, without decomposition.

The diluted Solution yields a brownish-red precipitate with ammonia water, a blue one with potassium ferrocyanide T.S., and a white one, insoluble in hydrochloric acid, with barium chloride T.S.

On slowly mixing 2 volumes of the Solution with 1 volume of concentrated sulphuric acid, in a beaker, no solid white mass should separate on standing (difference from *subsulphate*).

On adding a clear crystal of ferrous sulphate to a cooled mixture of equal volumes of concentrated sulphuric acid and a diluted portion of the Solution (about 1 in 10), the crystal should not become brown, nor should a brownish-black color develop around it (absence of *nitric acid*).

If to a small portion of the Solution, diluted with about 10 volumes of water, a few drops of freshly prepared potassium ferricyanide T.S. be added, a pure brown color should be produced, without a tinge of green or greenish-blue (absence of *ferrous salt*).

If 1.11 Gm. of the Solution be introduced into a glass-stoppered bottle (having a capacity of about 100 Cc.), with 15 Cc. of water and 2 Cc. of hydrochloric acid, and, after the addition of 1 Gm. of potassium iodide, the mixture be kept for half an hour at a temperature of 40° C. (104° F.), then cooled, and mixed with a few drops of starch T.S., it should require not less than 20 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the blue or greenish color of the liquid (each Cc. of the tenth-normal sodium thiosulphate V.S. indicating 0.5 percent. of metallic iron).

LIQUOR FORMALDEHYDI

Solution of Formaldehyde

An aqueous solution, containing not less than 37 percent., by weight, of absolute Formaldehyde [H.COH = 29.79], an oxidation product of methyl alcohol. It should be kept in well-stoppered bottles, in a moderately warm place, protected from light.

A clear, colorless liquid, having a pungent odor and caustic taste; its vapor acts as an irritant upon the mucous membrane.

Specific gravity: from 1.075 to 1.081 at 25° C. (77° F.).

Miscible in all proportions with water and alcohol. On standing, Solution of Formaldehyde sometimes loses its transparency, the cloudiness being due to the separation of paraformaldehyde.

If Solution of Formaldehyde be evaporated over sulphuric acid, or in a vacuum, white, solid, paraformaldehyde is rapidly formed, which is insoluble in water, and which, when heated to about 100° C. (212° F.), sublimes, and between 153° and 172° C. (307.4° and 341.6° F.) melts, gaseous formaldehyde being evolved.

Solution of Formaldehyde should be neutral, or only faintly acid, to litmus paper.

If 5 Cc. of Solution of Formaldehyde be diluted with 25 Cc. of distilled water, and 3 Cc. of silver ammonium nitrate T.S. be added, a gray precipitate of finely divided metallic silver, which often adheres in part to the sides of the test-tube as a metallic mirror, will be produced.

If to 5 Cc. of sulphuric acid in which a little salicylic acid has been dissolved, 2 drops of Solution of Formaldehyde be added and the liquid very gently warmed, a permanent deep red color should immediately appear.

If 20 Cc. of Solution of Formaldehyde be evaporated to dryness on a water-bath, a white amorphous mass should remain, which, upon ignition, should leave not more than 0.05 percent. of residue (limit of *fixed impurities*).

If 20 Cc. of Solution of Formaldehyde, to which 2 drops of phenolphthalein T.S. have been added, be titrated with normal potassium hydroxide V.S., not more than 1 Cc. of the latter should be required for neutralization (absence of more than 0.2 percent. of *formic* and *other acids*).

If 20 Cc. of Solution of Formaldehyde be diluted with 60 Cc. of distilled water, and the liquid divided into four approximately equal portions, no turbidity or precipitate should be produced on the addition, severally, of silver nitrate T.S. (absence of *chloride*), barium chloride T.S. (absence of *sulphate*), hydrogen sulphide T.S. or potassium ferrocyanide T.S. (absence of *iron, lead, copper*, etc.), ammonium oxalate T.S. (absence of *calcium*).

Assay for Formaldehyde

Transfer 3 Cc. of Solution of Formaldehyde to a well-stoppered Erlenmeyer flask, and weigh accurately. Add 50 Cc. of normal sodium hydroxide V.S., and follow this immediately, but slowly, through a small funnel, with 50 Cc. of solution of hydrogen dioxide, to which a drop of litmus T.S. has been added, and which has been neutralized with normal sodium hydroxide V.S. After the reaction has ceased and the foaming has subsided, rinse the funnel and sides of the vessel with distilled water, and, after allowing it to stand thirty minutes, titrate back with normal sulphuric acid V.S., using litmus T.S. as indicator. Subtract the number of Cc. of normal sulphuric acid V.S. consumed, from 50 (the number of Cc. of normal sodium hydroxide V.S. employed), multiply the remainder by 2.979, and divide the product by the weight of the Solution taken; the quotient represents the percentage, by weight, of absolute Formaldehyde in the liquid.

LIQUOR HYDRARGYRI NITRATIS

Solution of Mercuric Nitrate

A liquid, which should contain about 60 percent. of Mercuric Nitrate $[Hg(NO_2.O)_2 = 321.64]$, and about 11 percent. of free nitric acid.

Red Mercuric Oxide, *forty grammes*	40 Gm.
Nitric Acid, *forty-five grammes*	45 Gm.
Distilled Water, *fifteen grammes*	15 Gm.
To make *one hundred grammes*	100 Gm.

Mix the Nitric Acid with the Distilled Water, and dissolve the Red Mercuric Oxide in the mixture. Keep the product in glass-stoppered bottles.

A clear, nearly colorless, heavy liquid, having a faint odor of nitric acid, and a strongly acid reaction.

Specific gravity: about 2.086 at 25° C. (77° F.).

On evaporating a few drops of the Solution in a porcelain dish, a white residue is left, which, on being heated, becomes successively yellow, red, and brown, and is finally completely volatilized.

On a bright surface of copper, the Solution deposits a coating of metallic mercury.

The Solution, diluted with water, yields with potassium hydroxide T.S. a yellow precipitate; and with potassium iodide T.S. a bright red one, soluble in an excess of the reagent.

A clear crystal of ferrous sulphate dropped into the Solution rapidly acquires a brown color, and becomes surrounded by a brownish-black zone.

No precipitation or cloudiness should occur in the Solution on the addition ater, or of diluted hydrochloric acid (absence of *mercurous salt*).

LIQUOR IODI COMPOSITUS

Compound Solution of Iodine

An aqueous solution, which should contain not less than 5 percent. of iodine and 10 percent. of potassium iodide.

Iodine, *five grammes*	5 Gm.
Potassium Iodide, *ten grammes*	10 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one hundred grammes*	100 Gm.

Dissolve the Iodine and Potassium Iodide in a sufficient quantity of Distilled Water to make the product weigh *one hundred grammes.* Keep the Solution in glass-stoppered bottles.

For complete decolorization 6.3 Gm. of the Solution should require not less than 24.75 Cc. of tenth-normal sodium thiosulphate V.S. (each Cc. of the tenth-normal sodium thiosulphate V.S. corresponding to 0.2 percent. of Iodine).

Average dose.— 0.2 Cc. (3 minims).

LIQUOR MAGNESII CITRATIS

Solution of Magnesium Citrate

Magnesium Carbonate, *fifteen grammes*	15.0 Gm.
Citric Acid, *thirty-three grammes*	33.0 Gm.
Syrup of Citric Acid, *sixty cubic centimeters*	60.0 Cc.
Potassium Bicarbonate, *two and one-half grammes*	2.5 Gm.
Water, *a sufficient quantity.*	

Dissolve the Citric Acid in *one hundred and twenty cubic centimeters* of Water, and, having added the Magnesium Carbonate, stir until it is dissolved. Filter the solution into a strong bottle of the capacity of about *three hundred and sixty cubic centimeters,* containing the Syrup of Citric Acid. Then add enough Water to nearly fill the bottle, drop in the Potassium Bicarbonate, and immediately stopper the bottle securely. Lastly, shake the mixture occasionally, until the Potassium Bicarbonate is dissolved. This Solution should be freshly prepared when wanted.

Average dose.— 360 Cc. (12 fluidounces).

LIQUOR PLUMBI SUBACETATIS

Solution of Lead Subacetate

An aqueous liquid, which should contain in solution not less than 25 percent. of Lead Subacetate [approximately $Pb_2O(CH_3.COO)_2 = 543.74$].

Lead Acetate, *one hundred and eighty grammes*	180 Gm.
Lead Oxide, *one hundred and ten grammes*	110 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand grammes* . .	1000 Gm.

To the finely powdered Lead Oxide contained in a porcelain dish, of about one liter capacity, add slowly and in portions, with constant stirring, the Lead Acetate which has been previously dissolved in *seven hundred cubic centimeters* of boiling Distilled Water, and boil the liquid for half an hour, with occasional stirring. Finally, when cool, filter the Solution, and add sufficient Distilled Water, which has been previously boiled and cooled, to make the finished product weigh *one thousand grammes.* Keep the Solution in well-stoppered bottles.

A clear, colorless liquid, odorless, having a sweetish, astringent taste, and an alkaline reaction. On exposure to the air it absorbs carbon dioxide, which causes the formation of a white precipitate.

Specific gravity: about 1.235 at 25° C. (77° F.).

When Solution of Lead Subacetate is added to a solution of acacia, it produces a dense, white precipitate (distinction from *normal lead acetate*).

In other respects the Solution conforms to the reactions and tests for an aqueous solution of lead acetate given under *Plumbi Acetas.*

If 10 Gm. of the Solution be diluted with distilled water, which has been previously boiled and cooled, to measure 100 Cc., and 13.6 (13.594) Cc. of this be added to 35 Cc. of tenth-normal oxalic acid V.S., contained in a graduated cylinder, and, after thoroughly shaking, the mixture be diluted with distilled water to measure 50 Cc., and again well shaken, then, after the precipitate has settled, 10 Cc. of the clear solution, after diluting with about 50 Cc. of water and adding 5 Cc. of sulphuric acid, should require not more than 2 Cc. of tenth-normal potassium permanganate V.S. to produce a permanent pink tint (each Cc. of tenth-normal oxalic acid V.S. required for the precipitation of the 13.6 Cc. of the diluted Solution, corresponding to 1 percent. of Lead Subacetate).

LIQUOR PLUMBI SUBACETATIS DILUTUS

Diluted Solution of Lead Subacetate

An aqueous liquid, which should contain about 1 percent. of Lead Subacetate.

Solution of Lead Subacetate, *forty grammes*	40 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand grammes* . .	1000 Gm.

Mix the Solution of Lead Subacetate with enough Distilled Water, previously boiled and cooled, to make the product weigh *one thousand* Keep the Solution in well-stoppered bottles.

LIQUOR POTASSII ARSENITIS

Solution of Potassium Arsenite

An aqueous solution, which should contain Potassium Arsenite corresponding in amount to 1 percent. of arsenic trioxide.

Arsenic Trioxide, in fine powder, *ten grammes*	10 Gm.
Potassium Bicarbonate, *twenty grammes*	20 Gm.
Compound Tincture of Lavender, *thirty grammes*	30 Gm.
Distilled Water, *a sufficient quantity*,	
To make *one thousand grammes*	1000 Gm.

Boil the Arsenic Trioxide and Potassium Bicarbonate, in a tared dish, with *one hundred grammes* of Distilled Water, until solution has been effected. Then add enough Distilled Water to make the solution weigh *nine hundred and seventy grammes*, and, lastly, add the Compound Tincture of Lavender. Filter through paper.

If 24.6 Gm. of Solution of Potassium Arsenite be diluted with water to 100 Cc., the mixture very slightly acidified with diluted hydrochloric acid, and then made alkaline with 2 Gm. of sodium bicarbonate, it should require not less than 50 Cc. of tenth-normal iodine V.S. to produce a permanent yellow tint (corresponding to 1 Gm. of arsenic trioxide in 100 Gm. of the Solution).

Average dose.— 0.2 Cc. (3 minims).

LIQUOR POTASSII CITRATIS

Solution of Potassium Citrate

An aqueous liquid, containing in solution not less than 8 percent. of anhydrous Potassium Citrate [$C_3H_4(OH)(COOK)_3 = 304.2$], with small amounts of citric and carbonic acids.

Potassium Bicarbonate, *eight grammes*	8 Gm.
Citric Acid, *six grammes*	6 Gm.
Distilled Water, *a sufficient quantity*,	
To make *one hundred cubic centimeters*	100 Cc.

Dissolve the Potassium Bicarbonate and the Citric Acid, each, in *forty cubic centimeters* of Distilled Water. Filter the solutions separately, and wash the filters with enough Distilled Water to obtain, in each case, *fifty cubic centimeters*. Finally, mix the two solutions, and, when effervescence has nearly ceased, transfer the liquid to a bottle. This preparation should be freshly made when wanted.

A clear, colorless liquid, odorless, having a mildly saline taste, and a slightly acid reaction.

It should conform to the reactions and tests for an aqueous solution of the salt given under *Potassii Citras*.

If 10.14 Gm. of Solution of Potassium Citrate be evaporated to dryness and then thoroughly carbonized at a temperature not exceeding a low red heat, and the residue extracted with boiling distilled water until the washings cease to react with methyl-orange T.S., the filtrate should require, for complete neutralization, not less than 16 Cc. of half-normal sulphuric acid V.S., methyl-orange T.S. being used as indicator (each Cc. of the half-normal sulphuric acid V.S. consumed representing 0.5 percent. of anhydrous Potassium Citrate).

Average dose.—16 Cc. (4 fluidrachms).

LIQUOR POTASSII HYDROXIDI

Solution of Potassium Hydroxide

[LIQUOR POTASSÆ, PHARM. 1890]

An aqueous solution, containing about 5 percent. of Potassium Hydroxide [KOH = 55.74].

Potassium Hydroxide, *sixty grammes*	60 Gm.
Distilled Water, *nine hundred and forty grammes*	940 Gm.
To make *one thousand grammes* . .	1000 Gm.

Dissolve the Potassium Hydroxide in the Distilled Water.

The Potassium Hydroxide used in this process should be of the full strength and quality directed by the Pharmacopœia (85 percent.). Potassium Hydroxide of any other strength, however, may be used, if a proportionately larger or smaller quantity be taken, the proper amount for the above formula being ascertained by dividing 5100 by the percentage of absolute Potassium Hydroxide contained therein.

Solution of Potassium Hydroxide should be kept in bottles made of green glass, and provided with glass stoppers coated with paraffin or petrolatum.

A clear, colorless liquid, odorless, having a very acrid and caustic taste, and a strongly alkaline reaction.

Specific gravity: about 1.046 at 25° C. (77° F.).

It should conform to the reactions and tests for an aqueous solution of potassium hydroxide given under *Potassii Hydroxidum*.

To neutralize 28 (27.87) Gm. of Solution of Potassium Hydroxide should require about 25 Cc. of normal sulphuric acid V.S., methyl-orange T.S. being used as indicator (each Cc. of normal sulphuric acid V.S. indicating 0.2 percent. of absolute Potassium Hydroxide).

Average dose.—1 Cc. (15 minims).

LIQUOR SODÆ CHLORINATÆ

Solution of Chlorinated Soda

[LIQUOR SODÆ CHLORATÆ, PHARM. 1890]

An aqueous solution of several chlorine compounds of sodium, containing at least 2.4 percent., by weight, of available chlorine.

Monohydrated Sodium Carbonate, *sixty-five grammes*	65 Gm.
Chlorinated Lime, *ninety grammes*	90 Gm.
Water, *a sufficient quantity,*	
To make *one thousand grammes*	1000 Gm.

Triturate the Chlorinated Lime (which should contain not less than 30 percent. of available chlorine) with *two hundred cubic centimeters* of Water, gradually added, until a uniform mixture results. Allow the heavier particles to subside, and transfer the thinner, supernatant portion to a filter. Then triturate the residue again with *two hundred cubic centimeters* of Water, transfer the whole to the filter, and, when the liquid has drained off, wash the filter and contents with *one hundred cubic centimeters* of Water. Dissolve the Monohydrated Sodium Carbonate in *three hundred cubic centimeters* of hot Water, and add this solution to the previously obtained filtrate contained in a suitable vessel. Stir or shake the mixture thoroughly, and, if it should become gelatinous, warm the vessel very gently, until the precipitate subsides. Then transfer the mixture to a new filter, and, when no more liquid drains from it, wash the filter and contents with enough Water to make the product weigh *one thousand grammes.* Keep the Solution in well-stoppered bottles, protected from light, and in a cool place.

A clear, pale greenish liquid, having a faint odor of chlorine, and a disagreeable, alkaline taste.

Specific gravity: about 1.050 at 25° C. (77° F.).

The Solution at first colors red litmus paper blue, and then bleaches it.

The addition of hydrochloric acid to the Solution causes an evolution of chlorine and carbon dioxide.

If 7 Gm. of the Solution be mixed with 50 Cc. of water, and 2 Gm. of potassium iodide and 10 Cc. of hydrochloric acid be added, not less than 48 Cc. of tenth-normal sodium thiosulphate V.S. should be required to discharge the final yellow color of the liquid (each Cc. of the tenth-normal sodium thiosulphate V.S. corresponding to 0.05 percent. of available chlorine).

Average dose.— 1 Cc. (15 minims).

LIQUOR SODII ARSENATIS

Solution of Sodium Arsenate

An aqueous solution, which should contain Sodium Arsenate corresponding in amount to not less than 1 percent. of Exsiccated Sodium Arsenate.

Exsiccated Sodium Arsenate, *one gramme*	1 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one hundred grammes*	100 Gm.

Dissolve the Exsiccated Sodium Arsenate in a sufficient quantity of Distilled Water to make the product weigh *one hundred grammes.*

The Solution should conform to the reactions and tests for an aqueous solution of the salt given under *Sodii Arsenas Exsiccatus.*

Average dose.— 0.2 Cc. (3 minims).

LIQUOR SODII HYDROXIDI

Solution of Sodium Hydroxide

[LIQUOR SODÆ, PHARM. 1890]

An aqueous solution, containing about 5 percent. of Sodium Hydroxide [$NaOH = 39.76$].

Sodium Hydroxide, *fifty-six grammes*	56 Gm.
Distilled Water, *nine hundred and forty-four grammes*	944 Gm.
To make *one thousand grammes* . .	1000 Gm.

Dissolve the Sodium Hydroxide in the Distilled Water.

The Sodium Hydroxide used in this process should be of the full strength and quality directed by the Pharmacopœia (90 percent.). Sodium Hydroxide of any other strength, however, may be used, if a proportionately larger or smaller quantity be taken; the proper amount for the above formula being ascertained by dividing 5040 by the percentage of absolute Sodium Hydroxide contained therein.

Solution of Sodium Hydroxide should be kept in bottles made of green glass, and provided with glass stoppers coated with paraffin or petrolatum.

A clear, colorless liquid, odorless, having a very acrid and caustic taste, and a strongly alkaline reaction.

Specific gravity: about 1.056 at 25° C. (77° F.).

It should conform to the reactions and tests for an aqueous solution of sodium hydroxide given under *Sodii Hydroxidum.*

To neutralize 20 (19.9) Gm. of Solution of Sodium Hydroxide there should be required about 25 Cc. of normal sulphuric acid V.S., methyl-orange T.S. being used as indicator (each Cc. of normal sulphuric acid V.S. indicating 0.2 percent. of absolute Sodium Hydroxide).

Average dose.— 1 Cc. (15 minims).

LIQUOR SODII PHOSPHATIS COMPOSITUS

Compound Solution of Sodium Phosphate

Sodium Phosphate, uneffloresced crystals, *one thousand grammes*	1000 Gm.
Sodium Nitrate, *forty grammes*	40 Gm.
Citric Acid, *one hundred and thirty grammes*	130 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Triturate the Sodium Phosphate and Sodium Nitrate, in a mortar, with the Citric Acid, until completely liquefied, then add sufficient Distilled Water to make the product measure *one thousand cubic centimeters.* Filter the liquid. Keep the Solution in well-stoppered bottles in a moderately warm place.

If to 1 Cc. of the Solution, diluted with an equal volume of water, a slight excess of ammonia water, followed by 1 Cc. of magnesia mixture T.S., be added, a white crystalline precipitate will be obtained.

If 1 Cc. of the Solution, diluted with 5 Cc. of water, be mixed with an equal volume of sulphuric acid, and to the cooled mixture a crystal of ferrous sulphate be added, a dark brown zone will appear around the crystal.

If 5 Cc. of the Solution be neutralized with ammonia water, an excess of calcium chloride T.S. added, and the mixture filtered, the filtrate, upon boiling, should deposit a white precipitate.

Average dose.—8 Cc. (2 fluidrachms).

LIQUOR ZINCI CHLORIDI

Solution of Zinc Chloride

An aqueous solution, containing about 50 percent., by weight, of Zinc Chloride [$ZnCl_2 = 135.26$].

Zinc, granulated, *two hundred and forty grammes*	240 Gm.
Hydrochloric Acid, *eight hundred and forty grammes*	840 Gm.
Nitric Acid, *twelve grammes*	12 Gm.
Precipitated Zinc Carbonate, *twelve grammes*	12 Gm.
Distilled Water, *a sufficient quantity*,	
To make about *one thousand grammes* . .	1000 Gm.

To the Zinc, contained in a glass or porcelain vessel, add *one hundred and fifty cubic centimeters* of Distilled Water; then gradually add the Hydrochloric Acid, and digest until reaction ceases and the Acid is saturated. Pour off the solution, add the Nitric Acid, and heat the solution at a temperature not exceeding 115° C. (239° F.), until a portion, if removed and cooled, solidifies. Allow it to cool, and dissolve the solidified mass in a sufficient quantity of Distilled Water to make the product weigh *one thousand grammes.* Then add the Precipitated Zinc Carbonate, agitate the mixture occasionally during twenty-four hours, and set it aside until it has become clear by subsidence. Finally, separate the clear Solution by decantation, or by means of a siphon.

A clear, colorless liquid, odorless, having a very astringent, metallic taste, and an acid reaction.

Specific gravity: about 1.548 at 25° C. (77° F.).

It should conform to the reactions and tests for an aqueous solution of the salt given under *Zinci Chloridum.*

LITHII BENZOAS

Lithium Benzoate

$LiC_7H_5O_2 = 127.11$

It should contain not less than 98.5 percent. of pure Lithium Benzoate [$C_6H_5.COOLi$], and should be kept in well-stoppered bottles.

A light, white powder, or small, shining, crystalline scales; odorless, or of faint benzoin-like odor, and of a cooling, sweetish taste: permanent in the air.

Soluble in 3 parts of water, and in 13 parts of alcohol, at 25° C. (77° F.); in 2.5 parts of boiling water, and in 10 parts of boiling alcohol. Its solubility in water is increased by the presence of sodium benzoate, but lessened when alcohol is the solvent.

When heated, the salt fuses; at a higher temperature it chars, emits inflammable vapors having a benzoin-like odor, and finally leaves a residue of lithium carbonate mixed with carbon. This residue imparts a crimson color to a non-luminous flame, and its aqueous solution has an alkaline reaction upon litmus paper.

The aqueous solution (1 in 20) of Lithium Benzoate has an alkaline reaction upon litmus, but is neutral to phenolphthalein T.S.

The addition of a few drops of ferric chloride T.S. to the above solution will produce a voluminous flesh-colored precipitate of ferric benzoate.

If an excess of hydrochloric acid be added to a concentrated aqueous solution of 0.6 Gm. of Lithium Benzoate, a white precipitate of benzoic acid will be formed, which, after collecting upon a filter and thoroughly washing and drying, should respond to the tests of purity given under *Acidum Benzoicum*.

If the filtrate and washings from this precipitate be evaporated almost to dryness on a water-bath, in a flat-bottomed flask of 50 Cc. capacity, and 10 Cc. of amyl alcohol (boiling point 132° C.) be added, and the mixture cautiously heated until the lower aqueous layer has evaporated, then, after the addition of 3 drops of hydrochloric acid and boiling for three minutes, the resulting insoluble residue should weigh not more than 0.004 Gm. (limit of *other alkalies*). The removal of the water from the amyl alcohol mixture is facilitated by passing a current of air through the hot solution.

If 1 Gm. of the salt be dissolved in 20 Cc. of water, and the benzoic acid precipitated by the addition of a sufficient quantity of hydrochloric acid, the filtrate should respond to the following tests of purity:

The addition of ammonia water until the solution has an alkaline reaction should produce neither turbidity nor precipitation, either before or after boiling (limit of *iron, aluminum, etc.*).

Another portion of this solution should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 0.5 Gm. of Lithium Benzoate be thoroughly mixed with about 1 Gm. of powdered anhydrous ammonium sulphate and cautiously ignited in a porcelain crucible, until of constant weight, the residue should weigh not less than 0.210 Gm., nor more than 0.216 Gm.

Average dose.—1 Gm. (15 grains).

LITHII BROMIDUM

Lithium Bromide

$LiBr = 86.34$

It should contain when well dried not less than 97 percent. of pure Lithium Bromide, and should be kept in well-stoppered bottles.

A white, granular salt, odorless, and having a sharp, slightly bitter taste; very deliquescent.

Soluble in 0.6 part of water at 25° C. (77° F.), and in 0.3 part of boiling water; very soluble in alcohol; also soluble in ether.

At a low red heat the salt fuses, and at a higher heat it is slowly volatilized. It imparts a crimson color to a non-luminous flame.

Silver nitrate T.S. produces a yellowish-white precipitate insoluble in nitric acid, and in a moderate excess of ammonia water.

The aqueous solution is slightly alkaline to litmus paper.

If there be added to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform, followed by chlorine water added cautiously, drop by drop, with constant agitation, the liberated bromine will dissolve in the chloroform, imparting to it a yellow to orange color, free from any violet tint (absence of *iodine*).

If 0.5 Cc. of sodium cobaltic nitrite T.S. be added to 5 Cc. of an aqueous solution of the salt (1 in 20), no precipitate or turbidity should occur within 10 minutes (limit of *potassium*).

If to 0.4 Gm. of Lithium Bromide contained in a flat-bottomed flask of 50 Cc. capacity, an excess of hydrochloric acid be added, and the mixture evaporated almost to dryness on a water-bath, and if 10 Cc. of amyl alcohol (boiling point 132° C.) be added and the mixture cautiously heated until the lower aqueous layer has evaporated, then, upon the addition of 3 drops of hydrochloric acid and boiling for three minutes, the resulting insoluble residue should weigh not more than 0.007 Gm. (limit of *other alkalies*). The removal of the water from the amyl alcohol mixture is facilitated by passing a current of air through the hot solution.

The addition of a slight excess of ammonia water to the aqueous solution of the salt (1 in 20), which has been acidulated with hydrochloric acid, should produce neither turbidity nor precipitation, either before or after boiling (limit of *iron*, *aluminum*, etc.).

An aqueous solution of the salt (1 in 20) should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of dry Lithium Bromide be dissolved in sufficient distilled water to measure 100 Cc., then 20 Cc. of this solution, to which 2 drops of potassium chromate T.S. are added, should require not less than 22.5 Cc., nor more than 23.9 Cc., of tenth-normal silver nitrate V.S. to produce a permanent red color.

Average dose.— 1 Gm. (15 grains).

LITHII CARBONAS

Lithium Carbonate

$Li_2CO_3 = 73.51$

It should contain not less than 98.5 percent. of pure Lithium Carbonate [$CO.(OLi)_2$], and should be kept in well-stoppered bottles.

A light, white powder, odorless, and having an alkaline taste; permanent in the air.

Soluble in 75 parts of water at 25° C. (77° F.), also in 140 parts of boiling water; much more soluble in water saturated with carbon dioxide; insoluble in alcohol; soluble in diluted acids with active effervescence.

At a low red heat the salt fuses; at a higher temperature it loses some of its carbon dioxide, and is partially converted into lithium oxide. Its solution in hydrochloric acid imparts a crimson color to a non-luminous flame.

The aqueous solution has an alkaline reaction upon litmus paper.

If 1 Gm. of Lithium Carbonate be dissolved in 40 Cc. of diluted acetic acid, no insoluble residue should remain.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Average dose. — [illegible] grains.

LITHII CITRAS

Lithium Citrate

$[illegible] + 4H_2O = [illegible]$

[illegible] should be kept in [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] Lithium Citrate [illegible] at 15° C. [illegible] F. be cautiously ignited in a porcelain crucible, and if, after cooling, the residue be moistened with a few drops each of nitric and sulphuric acids and again cautiously ignited, repeating the operation until the residue becomes white and of constant weight, then the residue of lithium sulphate should weigh not less than 0.387 Gm., nor more than 0.394 Gm.

The residue of lithium sulphate resulting from the above ignition, after being dissolved in 10 Cc. of boiling water and acidified with hydrochloric acid, should, upon the addition of ammonia water until the solution has an alkaline reaction, not become turbid or form a precipitate, either before or after boiling (limit of *iron*, *aluminum*, etc.).

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

LITHII CITRAS EFFERVESCENS

Effervescent Lithium Citrate

Lithium Citrate, *fifty grammes*	50 Gm.
Sodium Bicarbonate, dried and powdered, *five hundred and seventy grammes*	570 Gm.
Tartaric Acid, dried and powdered, *three hundred grammes*	300 Gm.
Citric Acid, uneffloresced crystals, *one hundred and ninety-five grammes*	195 Gm.
To make about *one thousand grammes*	1000 Gm.

Powder the Citric Acid and mix it intimately with the Lithium Citrate and Tartaric Acid, then thoroughly incorporate the Sodium Bicarbonate. Place the mixed powders on a plate of glass or in a suitable dish, in an oven heated between 93° and 104° C. (199.4° and 219.2° F.).

When the mixture, by the aid of careful manipulation with a wooden spatula, has acquired a moist consistence, rub it through a No. 6 tinned-iron sieve, and dry the granules at a temperature not exceeding 54° C. (129.2° F.). Keep the product in well-stoppered bottles.

Average dose.— 8 Gm. (120 grains).

LITHII SALICYLAS

Lithium Salicylate

$LiC_7H_5O_3 = 142.99$

It should contain not less than 98.5 percent. of pure Lithium Salicylate [$C_6H_4(OH)COOLi$], and should be kept in well-stoppered bottles.

A white or grayish-white powder, odorless, and having a sweetish taste; deliquescent in a moist atmosphere.

Very soluble in water and in alcohol.

When heated, the salt is decomposed, emitting the odor of phenol, and finally leaving a residue of lithium carbonate and carbon. It imparts a crimson color to a non-luminous flame.

The aqueous solution (1 in 20) should be neutral or slightly acid to litmus paper.

The aqueous solution should be colorless (absence of iron and organic coloring matter), and should not effervesce upon the addition of diluted acids (absence of carbonate).

If copper sulphate T.S. be added to an aqueous solution of the salt (1 in 20), the mixture should take a bright green color.

If a few drops of ferric chloride T.S. be added to an excess of a concentrated aqueous solution of Lithium Salicylate (1 in 4), a deep red color will be produced, which, after the liquid is largely diluted and mixed with more ferric chloride T.S., will change to a deep violet-blue tint.

Upon adding to 0.5 Gm. of the salt in a test-tube about 1 Cc. of concentrated sulphuric acid and cautiously, drop by drop, about 1 Cc. of methyl alcohol, then on heating the mixture to boiling the odor of oil of gaultheria will be evolved.

If an excess of hydrochloric acid be added to a concentrated aqueous solution of 1.0 Gm. of Lithium Salicylate, a voluminous precipitate of salicylic acid will be formed, which, after collecting upon a filter and thoroughly washing and drying, should conform to the reactions and tests given under *Acidum Salicylicum*.

If the filtrate and washings from this precipitate be evaporated almost to dryness on a water-bath, in a flat-bottomed flask of 50 Cc. capacity, and 10 Cc. of amyl alcohol (boiling point 132° C.) added, and if after cautiously heating until the water appears to have evaporated, 2 drops of hydrochloric acid be added and the solution boiled for three minutes, the resulting insoluble residue should weigh not more than 0.015 Gm. (limit of other alkalies). The removal of the water from the amyl alcohol mixture is facilitated by passing a current of air through the hot solution.

If 1 Gm. of the salt be dissolved in 20 Cc. of water, and the salicylic acid precipitated by the addition of a sufficient quantity of hydrochloric acid, the filtrate should respond to the following tests of purity:

The addition of ammonia water until the solution has an alkaline reaction should produce neither turbidity nor precipitation, either before or after boiling (limit of aluminium, iron, etc.).

Another portion of this solution should not respond to the Time-Limit Test for heavy metals (see Appendix, Test No. 127).

If 0.5 Gm. of dry Lithium Salicylate be thoroughly mixed with about 1 Gm. of powdered anhydrous ammonium sulphate, and cautiously ignited in a porcelain crucible until of constant weight, the residue should weigh not less than 0.18 Gm. nor more than 0.192 Gm.

Average dose.—1 Gm. (15 grains).

LOBELIA

Lobelia

The dried leaves and tops of *Lobelia inflata* Linné (Fam. *Campanulaceæ*), collected after a portion of the capsules have become inflated.

Leaves alternate, the lower short-petioled, the upper sessile, ovate or oblong, 4 to 9 Cm. long; irregularly serrate-denticulate, the divisions with a yellowish-brown, gland-like apex; pale green, pubescent; stems coarsely angled, often purplish, hairy, terminating in long racemes of small short-pedicelled flowers having an adherent 5-toothed calyx and a small tubular corolla, cleft to the base on the upper side, the one-sided limb 5-lobed, and pale blue in the fresh state, the five stamens united; capsule inflated, 2-celled, containing numerous minute brownish, ellipsoidal, coarsely reticulate seeds; odor slight, irritating; taste strongly acrid.

Average dose.—0.5 Gm. (7½ grains).

LUPULINUM

Lupulin

The glandular trichomes separated from the fruit of *Humulus Lupulus* Linné (Fam. *Moraceæ*).

A granular powder, bright brownish-yellow becoming yellowish-brown, and resinous; its component trichomes somewhat globular or ellipsoidal, 0.1 to 0.3 Mm. in diameter, multicellular; having the characteristic odor and taste of hops.

Not less than 60 percent. of Lupulin is soluble in ether, and when incinerated, it should yield not more than 10 percent. of ash.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

LYCOPODIUM

Lycopodium

The spores of *Lycopodium clavatum* Linné or of other species of *Lycopodium* (Fam. *Lycopodiaceæ*).

A fine, pale yellowish, very mobile powder, nearly inodorous and tasteless, floating upon water and not wetted by it, but sinking on being boiled with it, and burning with a quick flash when thrown into a flame.

Spores tetrahedral with one convex side, the surface being delicately reticulated, from 0.025 to 0.040 Mm. in diameter. The microscope should show no pollen or starch grains or particles of sand.

The ash remaining upon ignition should not exceed 5 percent.

MAGNESII CARBONAS

Magnesium Carbonate

Approximately $(MgCO_3)_4.Mg(OH)_2 + 5H_2O = 482.26$

Magnesium Carbonate $[(CO.O_2Mg)_4.Mg(OH)_2 + 5H_2O]$ should yield, upon ignition, not less than 40 percent. of residue, of which not less than 96 percent. should consist of pure magnesium oxide.

Light, white, friable masses, or a bulky, white powder, without odor, and having a slightly earthy taste; permanent in the air.

Practically insoluble in water, to which, however, it imparts a slightly alkaline reaction; insoluble in alcohol, but soluble in dilute acids with effervescence.

When strongly heated, the salt loses water and carbon dioxide, and is converted into magnesium oxide.

A filtered solution of the salt in diluted sulphuric acid, when mixed with ammonium chloride T.S. and an excess of ammonia water, yields with sodium phosphate T.S., a white, crystalline precipitate.

If a mixture of 1 Gm. of Magnesium Carbonate with 50 Cc. of water be heated to boiling, and, after cooling, filtered, the filtrate, if evaporated to dryness upon a water-bath, should leave not more than 0.01 Gm. of residue (limit of *foreign soluble salts*).

Ten Cc. of a solution of the salt (1 in 50), prepared by the addition of sufficient acetic acid for solution, should not be rendered more than slightly opalescent within five minutes by ammonium oxalate T.S. (limit of *calcium*).

If 1 Gm. of Magnesium Carbonate be ignited in a porcelain crucible, the residue should weigh not less than 0.40 Gm.

If 1 Gm. of Magnesium Carbonate be dissolved in 20 Cc. of diluted hydrochloric acid and 130 Cc. of water, the solution should be colorless and not give an immediate blue coloration upon the addition of potassium ferrocyanide T.S. (limit of *iron*), nor should another solution of the same strength respond to the Time-Limit Test for other *heavy metals* (see Appendix, Test No. 121).

If 0.400 Gm. of recently ignited and cooled Magnesium Carbonate be dissolved in 25 Cc. of normal sulphuric acid V.S., not more than 5.8 Cc. of normal potassium hydroxide V.S. should be required for neutralization, methyl-orange T.S. being used as indicator (each Cc. of normal sulphuric acid V.S. consumed, being equivalent to 5 percent. of pure magnesium oxide).

Average dose.—3 Gm. (45 grains).

MAGNESII OXIDUM

Magnesium Oxide Magnesia

$MgO = 40.06$

[MAGNESIA. PHARM. 1890]

It should contain, after ignition, not less than 96 percent. of pure Magnesium Oxide. It should be kept in well-closed vessels.

A white, very bulky, and very fine powder, without odor, and having an earthy, but not a saline, taste. On exposure to the air, it slowly absorbs moisture and carbon dioxide.

Almost insoluble in water, and insoluble in alcohol, but soluble in dilute acids.

When moistened with water, it has a faintly alkaline reaction upon red litmus paper.

On stirring 1 part of Magnesium Oxide with 15 parts of water, in a beaker, and allowing the mixture to stand for about half an hour, it will form a gelatinous mass of sufficient consistence to prevent it from dropping out when the beaker is inverted.

A solution of Magnesium Oxide in diluted sulphuric acid, mixed with ammonium chloride T.S. and an excess of ammonia water, yields, with sodium phosphate T.S., a white, crystalline precipitate.

If a mixture of 1 Gm. of Magnesium Oxide with 50 Cc. of water be heated to boiling, and, after cooling, filtered, the filtrate should not show more than a faintly alkaline reaction with red litmus paper, and when evaporated to dryness should not leave more than 0.04 Gm. of residue (limit of *foreign soluble salts*).

If a mixture of 0.1 Gm. of Magnesium Oxide with 5 Cc. of water be heated to boiling, and, after cooling, be poured into 5 Cc. of acetic acid, solution should take place without the evolution of more than a few isolated gas bubbles (limit of *carbonate*).

Ten Cc. of a solution of Magnesium Oxide (1 in 50), prepared by the addition of sufficient acetic acid for solution, should not be rendered more than slightly opalescent within five minutes by ammonium oxalate T.S. (limit of *calcium*).

If 1 Gm. of Magnesium Oxide be dissolved in 50 Cc. of diluted hydrochloric acid and 100 Cc. of water, the solution should be colorless and not give an immediate blue coloration upon the addition of potassium ferrocyanide T.S. (limit of *iron*), and a solution of Magnesium Oxide (1 in 20) in diluted hydrochloric acid should not respond to the Time-Limit Test for other *heavy metals* (see Appendix, Test No. 121).

If Magnesium Oxide be exposed to a low red heat in a porcelain crucible, it should not lose more than 15 percent. of its weight (limit of *water of hydration*).

If 0.400 Gm. of recently ignited and cooled Magnesium Oxide be dissolved in 25 Cc. of normal sulphuric acid V.S., not more than 5.8 Cc. of normal potassium hydroxide V.S. should be required for neutralization, methyl-orange T.S. being used as indicator (each Cc. of the normal sulphuric acid V.S. consumed being equivalent to 5 percent. of pure Magnesium Oxide).

Average dose.—2 Gm. (30 grains).

MAGNESII OXIDUM PONDEROSUM

Heavy Magnesium Oxide Heavy Magnesia

$MgO = 40.06$

[MAGNESIA PONDEROSA, PHARM. 1890]

A white, dense, and very fine powder, which should conform to the reactions and tests given under *Magnesii Oxidum.*

It differs, however, from the latter in not readily uniting with water to form a gelatinous hydroxide.

Average dose.—2 Gm. (30 grains).

MAGNESII SULPHAS

Magnesium Sulphate

$MgSO_4 + 7H_2O = 244.69$

It should contain not less than 99.7 percent. of pure Magnesium Sulphate [$SO_2.O_2Mg + 7H_2O$], and should be kept in well-closed vessels.

Small, colorless, prismatic needles or rhombic prisms, without odor, and having a cooling, saline, and bitter taste; slowly efflorescent in the air.

Soluble in 1.1 part of water at 25° C. (77° F.), and in 0.13 part of boiling water; insoluble in alcohol.

When heated to 52° C. (125.6° F.), or exposed to warm air, the salt loses one molecule of water, and is converted into a white powder. At about 130° C. (266° F.) it still retains 1 molecule of water, and at a temperature between 200° and 238° C. (392° and 460.4° F.) it is rendered anhydrous.

An aqueous solution of Magnesium Sulphate is neutral to litmus paper.

When mixed with ammonium chloride T.S. and ammonia water, the aqueous solution of the salt yields with sodium phosphate T.S., a white crystalline precipitate. With barium chloride T.S. it yields a white precipitate insoluble in hydrochloric acid.

Ten Cc. of the aqueous solution of the salt (1 in 20) should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.—16 Gm. (240 grains).

MAGNESII SULPHAS EFFERVESCENS

Effervescent Magnesium Sulphate

Magnesium Sulphate, uneffloresced crystals, *five hundred grammes*	500 Gm.
Sodium Bicarbonate, dried and powdered, *four hundred and three grammes*	403 Gm.
Tartaric Acid, dried and powdered, *two hundred and eleven grammes*	211 Gm.
Citric Acid, uneffloresced crystals, *one hundred and thirty-six grammes*	136 Gm.
To make about *one thousand grammes* . .	1000 Gm.

Dry the Magnesium Sulphate on a water-bath, until it ceases to lose weight, then, after powdering the dry salt, mix it intimately with the Citric Acid, which has previously been powdered, and the Tartaric Acid, and thoroughly incorporate the Sodium Bicarbonate. Place the mixed powders on a plate of glass or in a suitable dish, in an oven heated to between 93° and 104° C. (199.4° and 219.2° F.).

When the mixture has acquired a moist consistence by the aid of careful manipulation with a wooden spatula, rub it through a No. 6 tinned-iron sieve, and dry the granules at a temperature not exceeding 54° C. (129.2° F.). Keep the product in well-stoppered bottles.

Average dose.—16 Gm. (240 grains).

MALTUM

Malt

The grain of barley, *Hordeum distichon* Linné (Fam. *Gramineæ*), partially germinated artificially, and then dried.

Yellowish or amber-colored grains, shading to brown; crisp when fractured, the interior surface whitish, or tinged with brown if the grains have been heated sufficiently to cause caramelization.

It should have an agreeable, characteristic odor, and a sweet taste due to the conversion of the starch in the seed into maltose, through the action of diastase. Malt should float on cold water.

The solid soluble constituents of Malt, obtained by evaporating an aqueous infusion to dryness, should weigh not less than 70 percent. of the dried Malt from which they are derived.

The acidity of Malt (calculated as lactic acid), should not exceed 0.3 percent.

MANGANI DIOXIDUM PRÆCIPITATUM

Precipitated Manganese Dioxide

[To replace MANGANI DIOXIDUM, PHARM. 1890]

Chiefly Manganese Dioxide [$MnO_2 = 86.36$] with small amounts of other oxides of manganese, corresponding to not less than 80 percent. of Manganese Dioxide.

Manganese Sulphate, *fifty grammes*	50 Gm.
Ammonia Water, *two hundred and fifty cubic centimeters*	250 Cc.
Solution of Hydrogen Dioxide, *two hundred and fifty cubic centimeters*	250 Cc.
Distilled Water, *a sufficient quantity.*	

Dissolve the Manganese Sulphate in *one thousand cubic centimeters* of Distilled Water. Dilute the Ammonia Water with an equal volume of Distilled Water, and mix it with the Solution of Hydrogen Dioxide, which has also been diluted with an equal volume of Distilled Water. Pour the mixed solutions slowly, with constant stirring, into the solution of Manganese Sulphate. Allow the mixture to stand for one hour, stirring frequently. Then decant the supernatant clear liquid from the precipitate, and wash the latter repeatedly by affusion and decantation with hot Distilled Water, using *one thousand cubic centimeters* each time. Collect the precipitate on a plain filter, and continue the washing with hot Distilled Water until the washings no longer have an alkaline reaction upon red litmus paper, and produce no turbidity when mixed with barium chloride test solution. Allow the precipitate to drain, then dry it at 150° C. (302° F.).

A heavy, very fine, black powder, without odor or taste ; permanent in the air. Insoluble in water or alcohol. It is not affected by concentrated sulphuric acid, but when heated with this acid it is converted into manganous sulphate, with the evolution of oxygen.

When heated with hydrochloric acid, it is converted into manganous chloride, with the evolution of chlorine. At a red heat Precipitated Manganese Dioxide gives off oxygen, and is converted into reddish-brown manganoso-manganic oxide (Mn_3O_4).

On intimately mixing 1 part of the Dioxide with 1 part of potassium hydroxide and 1 part of potassium chlorate, introducing the mass into a crucible, moistening with water, drying and igniting, a dark fused mass is obtained which yields, with water, a green solution, changing to purplish-red on being boiled, or on the addition of diluted sulphuric acid.

If to 1 Gm. of the Dioxide and 2 Gm. of oxalic acid, 20 Cc. of water be added, followed by 3 Cc. of sulphuric acid, and the mixture digested for several hours on a water-bath, complete solution should be effected (absence of *antimony sulphide* and *insoluble substances*).

If 0.2 Gm. of Precipitated Manganese Dioxide be dissolved in a mixture of 50 Cc. of tenth-normal oxalic acid V.S. and 3 Cc. of sulphuric acid contained in a flask and heated on a water-bath, the resulting solution, after dilution with 100 Cc. of warm water, should require the addition of not more than 13 (12.95)

Cc. of tenth-normal potassium permanganate V.S. to produce a slight pink tint (corresponding to not less than 80 percent. of pure Manganese Dioxide).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

MANGANI HYPOPHOSPHIS

Manganese Hypophosphite

$Mn(PH_2O_2)_2 + H_2O = 201.54$

It should contain not less than 97 percent. of pure Manganous Hypophosphite $[(PH_2O.O)_2Mn + H_2O]$, and be kept in well-stoppered vials.

A pink crystalline powder, odorless, and nearly tasteless; permanent in the air.

Soluble in 6.6 parts of water at 25° C. (77° F.), and in 6 parts of boiling water; almost insoluble in alcohol.

The aqueous solution of the salt (1 in 20) is acid to litmus paper, and yields, with ammonium sulphide T.S., a salmon-colored precipitate of manganese sulphide, soluble in acetic acid.

When strongly heated in a dry test-tube, the salt evolves spontaneously inflammable hydrogen phosphide gas, and on complete ignition leaves a residue of manganous pyrophosphate.

Manganese Hypophosphite is readily oxidized by nitric acid and other oxidizing agents.

If a small quantity of an aqueous solution of the salt (1 in 20) be acidulated with hydrochloric acid, and mercuric chloride T.S. added in excess, a white precipitate of mercurous chloride will be produced, which, upon further addition of the acidulated solution, is reduced to metallic mercury.

If to 0.5 Gm. of the salt 5 Cc. of acetic acid be added, no effervescence should occur (absence of *carbonate*).

If 0.25 Gm. of the salt be boiled with 10 Cc. of potassium hydroxide T.S., a light salmon-colored precipitate will be produced which gradually acquires a brown color on exposure to the air, and if the filtered liquid, after being slightly acidulated with hydrochloric acid and then rendered alkaline with ammonia water, be divided into two portions, one should yield no precipitate upon the addition of magnesia mixture T.S. (absence of *phosphate*), while the remaining portion should not be affected by ammonium oxalate T.S. (absence of *calcium*).

If 5 Cc. of the aqueous solution of the salt (1 in 10) be poured into an evaporating dish containing 3 Cc. of nitric acid, diluted with about 10 Cc. of water and evaporated to dryness on a water-bath, the residue should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.— 0.200 Gm. = 200 milligrammes (3 grains).

MANGANI SULPHAS

Manganese Sulphate

$MnSO_4 + 4H_2O = 221.47$

It should contain not less than 99.5 percent. of pure Manganous Sulphate $[SO_2.O_2Mn + 4H_2O]$, and should be kept in well-stoppered bottles.

Colorless, or pale rose-colored, translucent, tetragonal prisms (crystallized at a temperature between 20° and 30° C. (68° and 86° F.), and containing 4 molecules, or 32.29 percent. of water of crystallization); odorless, and having a slightly bitter and astringent taste. Slightly efflorescent in the air.

Soluble in about 0.7 part of water at 25° C. (77° F.), and in 0.53 part of boiling water; insoluble in alcohol.

The aqueous solution (1 in 20) is neutral or very slightly acid to litmus paper, and yields, with ammonium sulphide T.S., a salmon-colored precipitate soluble in dilute acids; with potassium ferrocyanide T.S., a reddish-white precipitate; and with potassium ferricyanide T.S., a brown precipitate.

With barium chloride T.S., it yields a white precipitate insoluble in hydrochloric acid.

If a fragment of Manganese Sulphate be mixed with a little sodium hydroxide and the mixture fused, it will yield a dark green mass, dissolving in water with a green color.

The aqueous solution of the salt (1 to 100), to which a few drops of hydrochloric acid and a few drops of chlorine water have been added, should, after having been boiled, not be colored red by potassium sulphocyanate T.S. (limit of *iron*). Another solution (1 in 20) should not respond to the Time-Limit Test for *heavy metals*, omitting the addition of ammonia water (see Appendix, Test No. 121).

If the manganese be completely precipitated from an aqueous solution of 3 Gm. of the salt by the addition of ammonium carbonate T.S., the filtrate, on evaporation and gentle ignition, should leave no weighable residue (absence of *salts of the alkalies*, and of *magnesium*).

A solution of 1 Gm., each, of the salt, and of sodium acetate, in 10 Cc. of water, to which a few drops of acetic acid have been added, should not be affected by hydrogen sulphide T.S. (absence of *zinc*).

If 1 Gm. of the salt be gently ignited, in a porcelain crucible, it should lose not more than 0.323 Gm. of its weight (distinction from *Manganese Sulphate containing a larger amount of water of crystallization*).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

MANNA

Manna

The concrete saccharine exudation of ***Fraxinus Ornus*** Linné (Fam. *Oleaceæ*).

In irregular, more or less elongated, flattish, 3-sided pieces; externally yellowish-white; friable, somewhat waxy; internally whitish, porous and crystalline; odor suggestive of maple sugar; taste sweet, slightly bitter and faintly acrid.

On heating 5 parts of Manna with 100 parts of alcohol to boiling, and filtering, the filtrate should rapidly deposit crystals of mannite.

Average dose.— 16 Gm. (240 grains).

MARRUBIUM

Marrubium

The dried leaves and flowering tops of ***Marrubium vulgare*** Linné (Fam. *Labiatæ*).

Branches quadrangular, grayish-green, densely white-hairy; leaves opposite, petiolate, roundish-ovate, 1.5 to 5 Cm. long, obtuse, coarsely crenate, strongly rugose-veined, more or less white-hairy, especially underneath; flowers in dense axillary whorls, with a 10-toothed calyx, the divisions of which are slightly unequal, erect-spreading and pungent; corolla small, whitish, bilabiate; stamens four, included; fruit of four ovoid, obtuse, nearly smooth nutlets, about 1.5 Mm. long; odor distinct, rather agreeable; taste somewhat aromatic and bitter.

Average dose.— 2 Gm. (30 grains).

MASSA FERRI CARBONATIS

Mass of Ferrous Carbonate

Ferrous Sulphate, in clear crystals, *one hundred grammes* . . .	100 Gm.
Monohydrated Sodium Carbonate, *forty-six grammes* . . .	46 Gm.
Clarified Honey, *thirty-eight grammes*	38 Gm.
Sugar, in coarse powder, *twenty-five grammes*	25 Gm.
Syrup, **Distilled Water**, each, *a sufficient quantity*,	
To make *one hundred grammes* . .	100 Gm.

Dissolve the Ferrous Sulphate and the Monohydrated Sodium Carbonate, each separately, in *two hundred cubic centimeters* of boiling Distilled Water, and, having added *twenty cubic centimeters* of Syrup to the solution of the Iron salt, filter both solutions, and allow them to become cold. Introduce the solution of Monohydrated Sodium Carbonate into a bottle having a capacity of about *five hundred cubic centimeters*, and gradually add the solution of the Iron salt, rotating the bottle constantly or frequently, until carbonic acid gas no longer escapes. Add a sufficient quantity of Distilled Water to fill the bottle; then cork it and set it aside, so that the Ferrous Carbonate may subside. Pour off the supernatant liquid, and, having mixed Syrup and Distilled Water in the proportion of *one volume* of Syrup to *nineteen volumes* of Distilled Water, wash the precipitate with the mixture by decantation until the washings no longer have a saline taste. Drain the precipitate on a muslin strainer, and express as much of the Water as possible. Lastly, mix the precipitate at once with the Honey and Sugar, and, by means of a water-bath, evaporate the mixture in a tared dish, with constant stirring, until it is reduced to *one hundred grammes*.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

MASSA HYDRARGYRI

Mass of Mercury

Mercury, *thirty-three grammes*	33 Gm.
Glycyrrhiza, in No. 60 powder, *ten grammes*	10 Gm.
Althæa, in No. 60 powder, *fifteen grammes*	15 Gm.
Glycerin, *nine grammes*	9 Gm.
Honey of Rose, *thirty-three grammes*	33 Gm.
To make *one hundred grammes* . .	100 Gm.

riturate the Mercury with the Honey of Rose until it is extin-
shed and globules of Mercury are no longer visible under a lens

magnifying at least ten diameters. Add the Glycerin, then the Glycyrrhiza and Althæa gradually, and continue the trituration until the mass is homogeneous. Keep the product in well closed containers.

If a portion of the Mass be triturated in a mortar, with warm acetic acid, the filtrate should not become more than slightly opalescent on the addition of a few drops of hydrochloric acid (limit of *mercurous oxide*).

If another portion of the Mass be digested with warm, diluted hydrochloric acid and a little purified animal charcoal, the filtrate should not be affected by hydrogen sulphide T.S., or by stannous chloride T.S. (absence of *mercuric oxide*).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

MASTICHE

Mastic

A concrete resinous exudation from *Pistacia Lentiscus* Linné (Fam. *Anacardiaceæ*).

In subglobular, lenticular, elongated or pear-shaped tears, about 3 Mm. in diameter, pale yellow or greenish-yellow, transparent, having a glass-like lustre, the surface sometimes very slightly dusty; brittle, becoming plastic when chewed; odor slight, balsamic; taste mild, terebinthinate.

Mastic is completely soluble in ether and almost completely soluble in alcohol. The acid number should not be less than 65 (see Appendix, Test No. 98).

Average dose.— 2 Gm. (30 grains).

MATICO

Matico

The leaves of *Piper angustifolium* Ruiz and Pavon (Fam. *Piperaceæ*).

From 10 to 15 Cm. long, short-petiolate, oblong-lanceolate; apex pointed, base unequally heart-shaped, margin very finely crenulate; tessellated above, reticulate beneath, the meshes small, and the veins densely brownish-hairy; aromatic, spicy, bitterish, and astringent.

Average dose.— 4 Gm. (60 grains).

MATRICARIA

Matricaria

The dried flower-heads of *Matricaria Chamomilla* Linné (Fam. *Compositæ*).

About 6 or 8 Mm. broad, exclusive of the rays, with a flattish imbricated involucre, a conical, hollow, and naked receptacle, 10 to 20 white ligulate and reflexed pistillate ray-florets which are about 8 Mm. long, and numerous yellow, tubular, perfect disk-florets without pappus; odor somewhat disagreeably aromatic; taste strongly aromatic and bitter.

The similar flower-heads of *Anthemis arvensis* Linné, and *Maruta Cotula* De Candolle (Fam. *Compositæ*), have conical, solid, and chaffy receptacles.

Average dose.— 16 Gm. (240 grains).

MEL

Honey

A saccharine secretion deposited in the honey-comb by the bee, *Apis mellifera* Linné.

A syrupy liquid of a light yellowish to yellowish-brown color, translucent when fresh, but gradually becoming opaque and crystalline, having a characteristic, aromatic odor, and a sweet, faintly acrid taste.

When recent Honey is diluted with twice its weight of water, the resulting liquid should be almost clear, not stringy, and should have a specific gravity not lower than 1.099 (corresponding to a specific gravity of 1.370 for the original Honey).

When Honey is incinerated in small portions at a time in a platinum crucible, it should not leave more than 0.3 percent. of ash.

Honey has a faintly acid reaction upon litmus paper, and is lævogyrate.

If 5 Gm. of Honey be dissolved in 20 Gm. of water, a clear or nearly clear solution will result, which should not be rendered more than faintly opalescent by a few drops of silver nitrate T.S. (limit of *chlorides*), or of barium chloride T.S. (limit of *sulphates*).

If 2 Cc. of a filtered solution of the Honey (1 in 4) be placed in a test-tube 1 Cm. in diameter, and 1 Cc. of absolute alcohol be allowed to flow down the walls of the tube held in an inclined position, so as to form an overlying layer, this should remain clear, and the line of contact should not show more than barely noticeable opalescence, which soon disappears; a permanent milky zone should not be produced (absence of *starch sugar*).

If 2 Cc. of pure concentrated sulphuric acid be placed in a test-tube of 1 Cm. diameter, and 0.5 Cc. of a solution of Honey (1 in 4) be allowed to flow upon it so as to form a distinct upper layer, no colored line of contact should show at once, and at the end of one hour the zone of contact should be at most yellowish or clear brown; a brownish color becoming nearly black at the end of half an hour should not develop (absence of *cane sugar*).

On boiling 1 part of Honey with 5 parts of water, the resulting solution, when cold, should not be rendered blue or green on the addition of iodine T.S. (absence of *starch*).

MEL DEPURATUM

Clarified Honey

[MEL DESPUMATUM, PHARM. 1890]

Honey, *a convenient quantity.*
Distilled Water,
Glycerin, each, *a sufficient quantity.*

Mix the Honey intimately with *two percent.* of its weight of paper-pulp, which has been previously reduced to shreds, thoroughly washed and soaked in water, and then strongly expressed and again shredded. Then apply the heat of a water-bath, and, as long as any scum rises to the surface, carefully remove this. Finally, add enough Distilled

Water to make up the loss incurred by evaporation, strain, and mix the strained liquid with *five percent.* of its weight of glycerin.

Clarified Honey should conform to the tests of purity given under *Mel.*

MEL ROSÆ

Honey of Rose

Fluidextract of Rose, *one hundred amd twenty cubic centimeters*	120 Cc.
Clarified Honey, *a sufficient quantity,*	
To make *one thousand grammes* . .	1000 Gm.

Into a tared vessel introduce the Fluidextract of Rose, then add enough Clarified Honey to make the contents weigh *one thousand grammes*, and mix thoroughly.

Average dose.— 4 Cc. (1 fluidrachm).

MENTHA PIPERITA

Peppermint

The dried leaves and flowering tops of *Mentha piperita* Linné (Fam. *Labiatæ*).

Branches quadrangular, with scattered, deflexed hairs; leaves petiolate, ovate-lanceolate, 3 to 8 Cm. long, acute, sharply serrate, light or dark green; flower-whorls in oblong or oval spikes which are usually compact, or somewhat interrupted at the base, 1 to 1.5 Cm. broad, rounded at the summit, when in fruit becoming 3 to 7 Cm. long; calyx tubular, 5-toothed and often purplish; corolla small, purplish, and 4-lobed; stamens four, short and equal; odor strong and characteristic; taste pungent and cooling.

Average dose.— 4 Gm. (60 grains).

MENTHA VIRIDIS

Spearmint

The dried leaves and flowering tops of *Mentha spicata* Linné (*Mentha viridis* Linné) (Fam. *Labiatæ*).

Closely resembling Peppermint (see *Mentha Piperita*), but the leaves usually sessile and lanceolate, the flower-spikes usually slender, interrupted, cylindrical, or crowded, conical at the apex, 5 to 8 Mm. thick, becoming when in fruit 5 to 10 Cm. long; the stamens rather long; odor and taste resembling, but distinguishable from those of Peppermint.

Average dose.— 4 Gm. (60 grains).

MENTHOL

Menthol

$C_{10}H_{19}OH = 154.98$

A secondary alcohol [$C_6H_9(CH_3)(OH)(C_3H_7)$ 1:3:4], obtained from the oil from *Mentha piperita* Linné, or other peppermint oils. Menthol should be kept in well-stoppered bottles, in a cool place.

Colorless, acicular or prismatic crystals having a strong and pure odor of peppermint, and a warm, aromatic taste, followed by a sensation of cold when air is drawn into the mouth.

Menthol is only slightly soluble in water, but imparts to the latter its odor and taste. It is freely soluble in alcohol, ether, and chloroform.

It melts at 43° C. (109.4° F.) to a colorless liquid, boils at 212° C. (413.6° F.), and volatilizes slowly at the ordinary temperature.

When it is triturated with about an equal weight of camphor, thymol, or hydrated chloral, the mixture becomes liquid.

Its alcoholic solution is neutral to litmus paper, and is lævogyrate.

If a little Menthol be heated in an open dish, on a water-bath, it should gradually volatilize without leaving any residue (absence of *wax*, *paraffin*, or *inorganic substances*).

If a few crystals of Menthol be dissolved in 1 Cc. of glacial acetic acid, and then 3 drops of sulphuric acid and 1 drop of nitric acid added, no green color should be produced (absence of *thymol*).

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

METHYLIS SALICYLAS

Methyl Salicylate

$CH_3C_7H_5O_3 = 150.92$

[METHYL SALICYLAS, PHARM. 1890]

An ester [$C_6H_4(OH)COOCH_3$ 1:2], produced synthetically: it is the principal constituent of Oil of Gaultheria and Oil of Betula. For flavoring purposes, Oil of Gaultheria, Oil of Betula, and Methyl Salicylate may be regarded as identical products. It should be kept in well-stoppered bottles, protected from light.

A colorless liquid, having a characteristic, strongly aromatic, wintergreen odor, and a sweetish, warm, and aromatic taste.

Specific gravity: 1.180 to 1.185 at 25° C. (77° F.), according to the amount of moisture present.

Boiling point: 219° to 221° C. (426.2° to 429.8° F.).

It is optically inactive.

Sparingly soluble in water; soluble, in all proportions, in alcohol, glacial acetic acid, and carbon disulphide.

The alcoholic solution is neutral or slightly acid to litmus paper.

If a drop of Methyl Salicylate be shaken with a little water, and a drop of ferric chloride T.S. subsequently added, a deep violet color will be produced.

When heated on a water-bath, in a flask provided with a suitable condenser, it should yield no distillate having the characteristics of *alcohol* or *chloroform*.

If to 1 Cc. of Methyl Salicylate, contained in a capacious test-tube, 10 Cc. of potassium hydroxide T.S. be added, and the mixture agitated, a clear, colorless or faintly yellowish solution should result, without the separation of any oily drops, either on the surface or at the bottom of the liquid (absence of *volatile oils*, or of *petroleum*).

If the alkaline liquid thus obtained be subsequently diluted with about three times its volume of water, and a slight excess of hydrochloric acid added, a white, crystalline precipitate will be produced which, when collected on a filter, washed with a little water, and recrystallized from hot water, should respond to the tests of identity and purity given under *Acidum Salicylicum* (absence of *methyl benzoate*, etc.).

Average dose.—1 Cc. (15 minims).

METHYLTHIONINÆ HYDROCHLORIDUM

Methylthionine Hydrochloride Methylene Blue

$C_{16}H_{18}N_3SCl = 317.36$

Tetramethylthionine Hydrochloride, obtained by the action of hydrogen sulphide upon an oxidation product of para-amido-dimethylaniline.

A dark green, crystalline powder, or in the form of prismatic crystals having a bronze-like lustre.

It is readily soluble in water and somewhat less readily in alcohol, the solutions having a deep blue color.

The addition of hydrochloric acid to its aqueous solution changes the color to a lighter shade of blue.

The addition of sodium hydroxide T.S. to the aqueous solution changes the color to a purplish shade, and if added in excess, produces a precipitate having a dull violet color.

The dry powder dissolved in sulphuric acid containing powdered zinc produces a solution which, upon standing, is gradually decolorized.

Two Gm. of Methylthionine Hydrochloride, when ignited, should leave not more than 0.008 Gm. of residue, which should be free from zinc oxide (absence of *commercial dye*, and *other mineral impurities*).

Two Gm. of Methylthionine Hydrochloride ignited with dry sodium carbonate and potassium nitrate should leave a residue which should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

MEZEREUM

Mezereum

The dried bark of *Daphne Mezereum* Linné, and of other European species of *Daphne* (Fam. *Thymeleaceæ*).

In long, thin, flexible, tough bands, the edges fringed with partly detached bast fibres; outer surface yellowish- or reddish-brown, obliquely striate or wrinkled, with numerous lenticels and occasional brownish-black fruit-heads of a lichen; inner surface yellowish-green or whitish, satiny-lustrous, finely striate; fracture tough, fibrous, the periderm readily separable from the yellowish-green cortex, inner bark lamellated; odor slight; taste very acrid.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

MISTURA CRETÆ

Chalk Mixture

Compound Chalk Powder, *twenty grammes*	20 Gm.
Cinnamon Water, *forty cubic centimeters*	40 Cc.
Water, *a sufficient quantity,*	
To make *one hundred cubic centimeters*	100 Cc.

Rub the Compound Chalk Powder in a mortar, with the Cinnamon Water and about *twenty cubic centimeters* of Water gradually added, to a uniform mixture; transfer this to a graduated vessel, and rinse the mortar with enough Water to make the product measure *one hundred cubic centimeters.* Mix the whole thoroughly. This preparation should be freshly made when wanted.

Average dose.— 16 Cc. (4 fluidrachms).

MISTURA FERRI COMPOSITA

Compound Iron Mixture

Ferrous Sulphate, in clear crystals, *six grammes*	6 Gm.
Myrrh, in small pieces, *eighteen grammes*	18 Gm.
Sugar, *eighteen grammes*	18 Gm.
Potassium Carbonate, *eight grammes*	8 Gm.
Spirit of Lavender, *sixty cubic centimeters*	60 Cc.
Rose Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Rub the Myrrh, Sugar, and Potassium Carbonate in a mortar, with *seven hundred cubic centimeters* of Rose Water, at first very gradually added, so that a uniform mixture may result. Transfer this to a graduated vessel, add the Spirit of Lavender, then the Ferrous Sulphate, previously dissolved in about *fifty cubic centimeters* of Rose Water, and, lastly, enough Rose Water to make the product measure *one thousand cubic centimeters.* Mix the whole thoroughly. This preparation should be freshly made when wanted.

Average dose.— 16 Cc. (4 fluidrachms).

MISTURA GLYCYRRHIZÆ COMPOSITA

Compound Mixture of Glycyrrhiza

Pure Extract of Glycyrrhiza, *thirty grammes*	30 Gm.
Syrup, *fifty cubic centimeters*	50 Cc.
Acacia, granulated, *thirty grammes*	30 Gm.
Camphorated Tincture of Opium, *one hundred and twenty cubic centimeters*	120 Cc.
Wine of Antimony, *sixty cubic centimeters*	60 Cc.
Spirit of Nitrous Ether, *thirty cubic centimeters*	30 Cc.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Rub the Pure Extract of Glycyrrhiza and Acacia, in a mortar, with *five hundred cubic centimeters* of Water, until they are dissolved. Transfer the solution to a graduated vessel containing the other ingredients, and rinse the mortar with enough Water to make the product measure *one thousand cubic centimeters.* Mix the whole thoroughly.

Average dose.— 8 Cc. (2 fluidrachms).

MISTURA RHEI ET SODÆ

Mixture of Rhubarb and Soda

Sodium Bicarbonate, *thirty-five grammes*	35 Gm.
Fluidextract of Rhubarb, *fifteen cubic centimeters*	15 Cc.
Fluidextract of Ipecac, *three cubic centimeters*	3 Cc.
Glycerin, *three hundred and fifty cubic centimeters*	350 Cc.
Spirit of Peppermint, *thirty-five cubic centimeters*	35 Cc.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Dissolve the Sodium Bicarbonate in about *four hundred cubic centimeters* of Water. Then add the Fluidextracts, the Glycerin, and the Spirit of Peppermint, and, lastly, enough Water to make the product measure *one thousand cubic centimeters.*

Average dose.— 4 Cc. (1 fluidrachm).

MORPHINA

Morphine

$C_{17}H_{19}NO_3 + H_2O = 300.92$

An alkaloid obtained from Opium.

Colorless, or white, shining, rhombic prisms, or fine needles, or a crystalline powder, odorless, and having a bitter taste; permanent in the air. It loses all of its water of crystallization at 100° C. (212° F.).

Soluble in 3330 parts of water, 100 parts of lime water, 168 parts of alcohol, 4464 parts of ether, 1800 parts of chloroform, 113.5 parts of amyl alcohol, and in 525 parts of acetic ether at 25° C. (77° F.); soluble in 1040 parts of water at 80° C. (176° F.), and in 76 parts of alcohol at 60° C. (140° F.); insoluble in benzene.

When heated slowly to about 200° C. (392° F.) it assumes a brown color, and when heated rapidly it melts at 254° C. (489.2° F.). Upon ignition, it is slowly consumed without leaving a residue.

Its aqueous solution shows an alkaline reaction to red litmus paper.

Sulphuric acid (free from nitrous compounds) added to Morphine produces no color or only a slight yellowish tint, but on heating, a brown color is developed.

Sulphuric acid containing a crystal of potassium iodate gives with Morphine a dark brown color. (*Codeine* yields a moss-green color, changing to brown, and *narcotine* a cherry-red color.)

Sulphuric acid containing a trace of selenous acid gives with Morphine a blue color, changing to green and then to brown. (*Codeine* yields a green color, changing to blue, and afterwards to grass-green; *narcotine* gives a green color, changing to brown, and then to cherry-red.)

Nitric acid produces with Morphine an orange-red color fading to yellow (difference from *quinine*). Sulphuric acid containing a trace of molybdic acid gives a purple color, changing to blue. Sulphuric acid containing in each Cc. one drop of solution of formaldehyde yields an intense purple color.

Mercuric potassium iodide T.S. produces in a solution of Morphine a white gelatinous precipitate.

A solution of sodium phosphomolybdate (1 in 20) produces in solutions of Morphine a yellow precipitate soluble in ammonia water.

Sulphuric acid containing a crystal of potassium dichromate gives no color at first, but after a time a green color (absence of *strychnine*, which yields a purple color, or of *acetanilide*, which gives a crimson color, changing to green).

Morphine solutions, when heated with an aqueous solution of potassium ferricyanide containing a drop of neutral ferric chloride solution, give a deep blue solution, from which, after standing, a blue precipitate separates (difference from *codeine*).

If 0.1 Gm. of Morphine be dissolved in 10 Cc. of diluted hydrochloric acid, no red coloration should be produced by the addition of a few drops of ferric chloride T.S. (absence of *meconic acid* or *meconates*).

If to a neutral solution of Morphine (1 in 100), made by the careful addition of diluted sulphuric acid, a few drops of ferric chloride T.S. be added, a blue color will be produced, which is destroyed by acids, alcohol, or by heating.

On adding 4 Cc. of potassium hydroxide T.S. to 0.2 Gm. of Morphine, a clear solution, free from any undissolved residue, should result (absence of, and difference from, various *other alkaloids*), and no odor of ammonia should be noticeable (absence of *ammonium salts*).

Average dose.—0.010 Gm. = 10 milligrammes ($\frac{1}{5}$ grain).

MORPHINÆ ACETAS

Morphine Acetate

$C_{17}H_{19}NO_3 . C_2H_4O_2 + 3H_2O = 396.26$

The acetate [$CH_3COOH . C_{17}H_{19}NO_3 + 3H_2O$] of the alkaloid morphine should be kept in well-stoppered, dark amber-colored vials; a minute quantity of free acetic acid should be present to prevent decomposition.

A white, or yellowish-white, crystalline or amorphous powder, having a faintly acetous odor, and a bitter taste. It gradually loses acetic acid when exposed to air, and becomes less soluble in water.

Soluble in 2.25 parts of water, 21.6 parts of alcohol, 480 parts of chloroform, and in 5.2 parts of glycerin at 25° C. (77° F.); soluble in 2 parts of water at 80° C. (176° F.), and in 2.5 parts of alcohol at 60° C. (140° F.); insoluble in ether.

When heated, the salt loses water and acetic acid, and melts at about 200° C. (392° F.). When ignited, it is consumed completely, leaving no residue.

The addition of diluted ammonia water in slight excess to an aqueous solution of Morphine Acetate causes a white precipitate, which, when collected and washed, should conform to the reactions and tests given under *Morphina*.

On adding sulphuric acid to the salt, vapors of acetic acid are evolved.

Ferric chloride T.S. produces, in neutral aqueous solutions of the salt, a blue color, destroyed by acids, alcohol, or by heating.

The color tests for the identification of Morphine Acetate and those showing the absence of impurities are identical with those described under *Morphina*.

Average dose.— 0.015 Gm. = 15 milligrammes ($\frac{1}{4}$ grain).

MORPHINÆ HYDROCHLORIDUM

Morphine Hydrochloride

$C_{17}H_{19}NO_3.HCl + 3H_2O = 372.86$

[MORPHINÆ HYDROCHLORAS, PHARM. 1890]

The hydrochloride [$HCl.C_{17}H_{19}NO_3 + 3H_2O$] of the alkaloid morphine should be kept in well-stoppered, amber-colored vials.

White, silky, glistening needles or microcrystalline cubes, or a white, crystalline powder, odorless, and having a bitter taste; permanent in the air. It loses its water of crystallization at 100° C. (212° F.).

Soluble in 17.2 parts of water, and in 42 parts of alcohol at 25° C. (77° F.); soluble in 0.5 part of water at 80° C. (176° F.), and in 35.5 parts of alcohol at 60° C. (140° F.); insoluble in ether and in chloroform.

When heated to 250° C. (482° F.), it assumes a brown color, and on higher heating, chars without melting. On ignition, it is slowly consumed, leaving no residue.

Its aqueous solution is neutral to litmus paper.

On shaking an aqueous solution of the salt with diluted ammonia water in slight excess, a crystalline precipitate is formed, which, when collected and washed, should respond to all tests and reactions given under *Morphina*.

Silver nitrate T.S. produces a white precipitate, insoluble in nitric acid.

Ferric chloride T.S. produces, in neutral aqueous solutions of the salt, a blue color, which is destroyed by acids, alcohol, or by heating.

On adding potassium carbonate T.S. to a solution of the salt (1 in 30), a white precipitate should be formed, which should dissolve in chloroform without color (absence of *apomorphine*).

The color tests for the identification of Morphine Hydrochloride and those showing the absence of impurities are identical with those described under *Morphina*.

Average dose.— 0.015 Gm. = 15 milligrammes ($\frac{1}{4}$ grain).

MORPHINÆ SULPHAS

Morphine Sulphate

$(C_{17}H_{19}NO_3)_2.H_2SO_4 + 5H_2O = 752.83$

The sulphate [$SO_2(OH)_2.(C_{17}H_{19}NO_3)_2 + 5H_2O$] of the alkaloid morphine should be kept in well-stoppered, amber-colored vials.

White, feathery, acicular, silky crystals, or in cubical masses, odorless, permanent in the air, and having a bitter taste. It loses three molecules of water of crystallization at 130° C. (266° F.).

Soluble in 15.3 parts of water, and in 465 parts of alcohol at 25° C. (77° F.); soluble in 0.6 part of water at 80° C. (176° F.), and in 187 parts of alcohol at 60° C. (140° F.); insoluble in ether and chloroform.

When heated to about 250° C. (482° F.), the salt assumes a brown color, and then chars without melting. When ignited, it is very slowly consumed, leaving no residue.

Its aqueous solution is neutral to litmus paper.

On adding a dilute solution of ammonia water in slight excess to its aqueous solution, and vigorously shaking the liquid, a precipitate is formed which, when collected and washed, should respond to all the tests and reactions given under *Morphina*.

Barium chloride T.S. produces a white precipitate, insoluble in hydrochloric acid.

Ferric chloride T.S., when added to neutral aqueous solutions of the salt, produces a blue color, which is destroyed by acids, alcohol, or by heating.

The color tests for the identification of Morphine Sulphate, and those showing the absence of impurities, are identical with those described under *Morphina*.

***Average dose.*—0.015 Gm. = 15 milligrammes (1/4 grain).**

MOSCHUS

Musk

The dried secretion from the preputial follicles of *Moschus moschiferus* Linné.

Usually in irregular, crumbly, somewhat unctuous grains, dark reddish-brown, having a peculiar, penetrating, and persistent odor and a bitterish taste.

About 10 to 12 percent. of Musk is soluble in alcohol, the solution being light brownish-yellow, and on the addition of water becoming slightly turbid; from 50 to 75 percent. is soluble in water, the solution being deep brown, faintly acid, and strongly odorous; moisture not more than 15 percent., and ash not more than 8 percent.

***Average dose.*—0.250 Gm. = 250 milligrammes (4 grains).**

MUCILAGO ACACIÆ

Mucilage of Acacia

Acacia, in small fragments, ***three hundred and forty grammes*** . .	**340 Gm.**
Lime Water, ***three hundred and thirty grammes***	**330 Gm.**
Water, ***a sufficient quantity,***	
To make ***one thousand grammes*** . .	**1000 Gm.**

Wash the Acacia with cold Water, and allow it to drain. Add the Lime Water to it, and enough Water to make the mixture weigh *one thousand grammes*, agitate or stir it occasionally until the Acacia is dissolved, and strain. Keep the product in well-stoppered, completely filled bottles, in a cool place.

***Average dose.*—16 Cc. (4 fluidrachms).**

MUCILAGO SASSAFRAS MEDULLÆ

Mucilage of Sassafras Pith

Sassafras Pith, *two grammes*	2 Gm.
Water, *one hundred cubic centimeters*	100 Cc.

Macerate the Sassafras Pith in the Water during three hours, and strain without expression. This preparation should be freshly made when wanted.

Average dose.— 16 Cc. (4 fluidrachms).

MUCILAGO TRAGACANTHÆ

Mucilage of Tragacanth

Tragacanth, *six grammes*	6 Gm.
Glycerin, *eighteen grammes*	18 Gm.
Water, *a sufficient quantity,*	
To make *one hundred grammes* . .	100 Gm.

Mix the Glycerin with *seventy-five cubic centimeters* of Water in a tared vessel, heat the mixture to boiling, add the Tragacanth, and macerate during twenty-four hours, stirring occasionally. Then add enough Water to make the mixture weigh *one hundred grammes*, beat it until it has a uniform consistence, and strain it forcibly through muslin.

Average dose.— 16 Cc. (4 fluidrachms).

MUCILAGO ULMI

Mucilage of Elm

Elm, bruised, *six grammes*	6 Gm.
Water, *one hundred cubic centimeters*	100 Cc.

Digest the Elm with the Water, on a water-bath, in a covered vessel, during one hour, then strain. This preparation should be freshly made when wanted.

Average dose.— 16 Cc. (4 fluidrachms).

MYRISTICA

Myristica

The kernel of the ripe seed of *Myristica fragrans* Houttuyn (Fam. *Myristicaceæ*).

Ovoid or ellipsoidal, about 25 Mm. long; externally light brown, reticulately furrowed, with a circular scar at the broad end; internally more or less mottled from the infolding of the light brown perisperm and tegmen with the yellowish-brown endosperm; easily cut, the cut surface having a waxy lustre; odor strongly aromatic; taste agreeably aromatic, warm, and slightly bitter.

***Average dose.*—0.500 Gm. = 500 milligrammes (7½ grains).**

MYRRHA

Myrrh

A gum-resin obtained from *Commiphora Myrrha* (Nees) Engler (Fam. *Burseraceæ*).

In roundish or irregular tears or masses, dusty, brownish-yellow or reddish-brown; fracture waxy, somewhat splintery, translucent on the edges, sometimes marked with whitish veins; odor balsamic; taste aromatic, bitter and acrid.

When triturated with water, Myrrh yields a brownish-yellow emulsion; with alcohol it yields a brownish-yellow tincture which acquires a purplish-red tint on the addition of nitric acid.

It does not swell or dissolve in water.

***Average dose.*—0.500 Gm. = 500 milligrammes (7½ grains).**

NAPHTHALENUM

Naphthalene

$C_{10}H_8 = 127.10$

[NAPHTALINUM, PHARM. 1890]

A hydrocarbon obtained from coal-tar, and purified by crystallization. It should be kept in well-stoppered, amber-colored bottles.

Colorless, shining, transparent laminæ, having a strong, characteristic odor resembling that of coal-tar, and a burning, aromatic taste; slowly volatilized on exposure to air; by exposure to light acquiring a brownish color.

Insoluble in water, but when boiled with it, the water acquires a faint odor and taste; soluble in 13 parts of alcohol at 25° C. (77° F.), and very soluble in boiling alcohol; also very soluble in ether, chloroform, carbon disulphide, and fixed or volatile oils.

Naphthalene volatilizes slowly at ordinary temperatures, but rapidly when heated. It also volatilizes with the vapors of water or alcohol. At 80° C. (176° F.) it melts, and at 218° C. (424.4° F.) it boils. Its vapor is inflammable, burning with a luminous but smoky flame. When ignited, it is consumed, leaving no residue.

Naphthalene is neutral to litmus paper moistened with alcohol.

On shaking a small portion of Naphthalene with concentrated sulphuric acid, the acid should remain colorless, and should not acquire more than a pale reddish tint if the mixture be heated for five minutes on a water-bath (absence of *impurities derived from coal-tar*).

***Average dose.*—0.125 Gm. = 125 milligrammes (2 grains).**

NUX VOMICA

Nux Vomica

The dried, ripe seed of *Strychnos Nux-vomica* Linné (Fam. *Loganiaceæ*), yielding, when assayed by the process given below, not less than 1.25 percent. of strychnine.

Orbicular, nearly flat, sometimes irregularly bent, 15 to 30 Mm. in diameter, 3 to 5 Mm. thick; externally grayish or greenish-gray, the surface covered with short, closely appressed, satiny hairs; rounded or somewhat acute at the margin, with a slight ridge extending from the centre of one side to the edge; internally whitish-gray, horny, very tough, the endosperm in two more or less regular concavo-convex halves, between which, at one end, lie the heart-shaped, palmately nerved cotyledons; inodorous; taste intensely and persistently bitter.

Powder light gray, the epidermal cells modified to strongly lignified hairs; endosperm cells thick-walled, containing a fixed oil and aleurone grains, and giving a blue or violet color with potassium dichromate and sulphuric acid; in the tissues of adhering fruit pulp occur a few small, nearly spherical starch grains.

Assay of Nux Vomica

Nux Vomica, in No. 60 powder, *twenty grammes* . . . . . . **20 Gm.**
Ammonia Water,
Ether,
Chloroform,
Alcohol,
Normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Nitric Acid (sp. gr. 1.42),
Sodium Hydroxide Solution (1 in 10),
Tenth-normal Sulphuric Acid V.S.,
Sulphuric Acid Solution (3 percent. H_2SO_4),
Iodeosin T.S., each, *a sufficient quantity.*

Introduce the Nux Vomica into a 250 Cc. Erlenmeyer flask and add to it 200 Cc. of a mixture of 137.5 Cc. of ether, 44 Cc. of chloroform, 13.5 Cc. of alcohol and 5 Cc. of ammonia water; insert the stopper securely and macerate with frequent shaking during one hour and allow it to stand in a cool place for twelve hours. Decant into a measuring cylinder 100 Cc. of the liquid (representing 10 Gm. of Nux Vomica), and pour this into a separator, preferably of a globular shape. Rinse the cylinder with a little chloroform, add this to the separator, and then add 15 Cc. of normal sulphuric acid V.S.; shake the mixture moderately during one minute, being careful to avoid emulsification; when the liquids have separated completely, draw off the acid liquid into a beaker. Repeat the shaking out with successive portions of 5 and 3 Cc. of normal sulphuric acid V.S.; collect the acid solutions and pour them into a separator. If a drop of the last acid solution yields a precipitate with mercuric potassium iodide T.S., repeat the shaking out of the ether solution with 5 Cc. of normal sulphuric acid V.S. To the combined acid solutions in the separator, add a small piece of red litmus paper, 25 Cc. of chloroform and then sufficient ammonia water to render the liquid alkaline, and shake the separator thoroughly. When the liquids have separated draw off the chloroform into a flask of 100 Cc. capacity, and repeat the shaking out of the alkaline liquid with two successive portions of 15 Cc. each of chloroform, adding the latter to that already in the flask. Evaporate the combined chloroformic solutions in the flask until the alkaloidal residue is dry, then dissolve it in 15 Cc. of sulphuric acid (3 percent.) warming it on a water-bath. When the solution has cooled, add 3 Cc. of a cooled mixture of equal volumes of nitric acid (specific gravity 1.42) and distilled water, and after rotating the liquid a few times, set it aside for exactly ten minutes, shaking it gently three times during this interval. Transfer the resulting red liquid to a separator containing 25 Cc. of an aqueous solution of sodium hydroxide (1 in 10) and wash the flask three times with very small amounts of distilled water, and add the washings to the separator. If the liquid is not turbid add 2 Cc. more of the solution of sodium hydroxide. Now add 20 Cc. of chloroform to the separator, and shake it well by a rotating motion for a few minutes, allow the liquids to separate, and draw off the chloroform through a small filter wetted with chloroform, into a flask. Repeat this twice, using 10 Cc. of chloroform each time, and draw off both portions into the flask, using the same filter. Finally, wash the filter and funnel with 5 Cc. of chloroform, and then evaporate all the chloroform by means of a water-bath very carefully, to avoid decrepitation. To the alkaloidal residue add 6 Cc. of tenth-normal sulphuric acid V.S., 5 drops of iodeosin T.S., about 80 Cc. of distilled water, and 20 Cc. of ether. When all the alkaloid is dissolved, titrate the excess of acid with fiftieth-normal potassium hydroxide V.S. until the aqueous liquid just turns pink. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract this number from 6 (the 6 Cc. of tenth-normal sulphuric acid V.S. taken), multiply the remainder by 0.0332, and this product by 10, which will give the percentage of strychnine in the Nux Vomica.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

OLEATUM ATROPINÆ

Oleate of Atropine

Atropine, *two grammes*	2 Gm.
Alcohol, *two cubic centimeters*	2 Cc.
Oleic Acid, *fifty grammes*	50 Gm.
Olive Oil, *a sufficient quantity,*	
To make *one hundred grammes*	100 Gm.

Triturate the Atropine in a tared mortar with the Alcohol, then add about an equal volume of the Oleic Acid, and, after warming the mortar, stir until the Alcohol has evaporated, add the remainder of the Oleic Acid, and continue stirring until the Atropine is dissolved; then add sufficient Olive Oil to make the product weigh *one hundred grammes.*

OLEATUM COCAINÆ

Oleate of Cocaine

Cocaine, *five grammes*	5 Gm.
Alcohol, *five cubic centimeters*	5 Cc.
Oleic Acid, *fifty grammes*	50 Gm.
Olive Oil, *a sufficient quantity,*	
To make *one hundred grammes*	100 Gm.

Triturate the Cocaine in a tared mortar with the Alcohol, then add about an equal volume of the Oleic Acid, and, after warming the mortar, stir until the Alcohol has evaporated, add the remainder of the Oleic Acid, and continue stirring until the Cocaine is dissolved; then add sufficient Olive Oil to make the product weigh *one hundred grammes.*

OLEATUM HYDRARGYRI

Oleate of Mercury

Yellow Mercuric Oxide, in very fine powder, *twenty-five grammes*	25 Gm.
Distilled Water, *twenty-five cubic centimeters*	25 Cc.
Oleic Acid, *a sufficient quantity,*	
To make *one hundred grammes*	100 Gm.

Triturate the Yellow Mercuric Oxide with the Distilled Water in a tared mortar; add *seventy grammes* of Oleic Acid, and mix thoroughly; warm the mortar to a temperature not exceeding 50° C. (122° F.), stir occasionally until the water has evaporated, then add, if necessary, Oleic Acid to make *one hundred grammes,* and mix thoroughly. Avoid contact with metallic utensils; preserve the Oleate in tightly stoppered bottles.

OLEATUM QUININÆ

Oleate of Quinine

Quinine, *twenty-five grammes*	25 Gm.
Oleic Acid, *seventy-five grammes*	75 Gm.
To make *one hundred grammes*	100 Gm.

Triturate the Quinine in a warm mortar with a small quantity of the Oleic Acid to a smooth paste. Then add the remainder of the Oleic Acid, previously warmed, and stir frequently, until the Quinine is dissolved.

OLEATUM VERATRINÆ

Oleate of Veratrine

Veratrine, *two grammes*	2 Gm.
Oleic Acid, *fifty grammes*	50 Gm.
Olive Oil, *a sufficient quantity,*	
To make *one hundred grammes*	100 Gm.

Triturate the Veratrine in a tared mortar with about *five cubic centimeters* of Olive Oil, and, after warming the mortar, add the Oleic

Acid, and continue stirring until the Veratrine is dissolved: then add sufficient Olive Oil to make the product weigh *one hundred grammes.*

OLEORESINA ASPIDII

Oleoresin of Aspidium

Aspidium, recently reduced to No. 40 powder, *five hundred grammes*	500 Gm.
Acetone, *a sufficient quantity.*	

Introduce the Aspidium into a cylindrical glass percolator, provided with a stop-cock, and arranged with a cover and a receptacle suitable for volatile liquids. Pack the powder firmly, and percolate slowly with Acetone, added in successive portions, until the Aspidium is exhausted. Recover the greater part of the Acetone from the percolate by distillation on a water-bath, and, having transferred the residue to a dish, allow the remaining Acetone to evaporate spontaneously in a warm place. Keep the Oleoresin in a well-stoppered bottle.

NOTE.—Oleoresin of Aspidium usually deposits, on standing, a granular, crystalline substance. This should be thoroughly mixed with the liquid portion before use.

Average dose.—2 Gm. (30 grains).

OLEORESINA CAPSICI

Oleoresin of Capsicum

Capsicum, in No. 40 powder, *five hundred grammes*	500 Gm.
Acetone, *a sufficient quantity.*	

Introduce the Capsicum into a cylindrical glass percolator, provided with a stop-cock, and arranged with a cover and a receptacle suitable for volatile liquids. Pack the powder firmly, and percolate slowly with Acetone, added in successive portions, until *eight hundred cubic centimeters* of percolate have been obtained. Recover the greater part of the Acetone from the percolate by distillation on a water-bath, and, having transferred the residue to a dish, allow the remaining Acetone to evaporate spontaneously in a warm place. Then pour off the liquid portion, transfer the remainder to a glass funnel provided with a pledget of cotton, and when the separated fatty matter (which is to be rejected) has been completely drained, mix the liquid portions together. Keep the Oleoresin in a well-stoppered bottle.

Average dose.—0.030 Gm. = 30 milligrammes (½ grain).

OLEORESINA CUBEBÆ

Oleoresin of Cubeb

Cubeb, in No. 30 powder, *five hundred grammes*	**500 Gm.**
Alcohol, *a sufficient quantity.*	

Introduce the Cubeb into a cylindrical glass percolator, pack the powder firmly, and percolate slowly with Alcohol, added in successive portions, until the Cubeb is exhausted. Recover the greater part of the Alcohol from the percolate by distillation on a water-bath, and, having transferred the residue to a dish, allow the remaining Alcohol to evaporate, with constant stirring, in a warm place. Keep the Oleoresin in a well-stoppered bottle.

NOTE.—Oleoresin of Cubeb deposits, after standing for some time, a waxy and crystalline matter, which should be rejected, the liquid portion only being used.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

OLEORESINA LUPULINI

Oleoresin of Lupulin

Lupulin, *five hundred grammes*	**500 Gm.**
Acetone, *a sufficient quantity.*	

Introduce the Lupulin into a cylindrical glass percolator, provided with a stop-cock, and arranged with a cover and a receptacle suitable for volatile liquids. Press the powder very lightly, and percolate slowly with Acetone, added in successive portions, until the Lupulin is exhausted. Recover the greater part of the Acetone from the percolate by distillation on a water-bath, and, having transferred the residue to a dish, allow the remaining Acetone to evaporate spontaneously in a warm place. Keep the Oleoresin in a well-stoppered bottle.

Average dose.— 0.200 Gm. = 200 milligrammes (3 grains).

OLEORESINA PIPERIS

Oleoresin of Pepper

Pepper, in No. 40 powder, *five hundred grammes*	**500 Gm.**
Acetone, *a sufficient quantity.*	

Introduce the Pepper into a cylindrical glass percolator, provided with a stop-cock, and arranged with a cover and a receptacle for volatile liquids. Pack the powder firmly, and percolate slowly with Acetone, added in successive portions, until the Pepper is exhausted.

Recover the greater part of the Acetone from the percolate by distillation on a water-bath, and, having transferred the residue to a dish, set this aside in a warm place until the remaining Acetone has evaporated, and the deposition of crystals of piperine has ceased. Lastly, separate the Oleoresin from the piperine by straining through purified cotton. Keep the Oleoresin in a well-stoppered bottle.

Average dose.—0.030 Gm. = 30 milligrammes ($\frac{1}{2}$ grain).

OLEORESINA ZINGIBERIS

Oleoresin of Ginger

Ginger, in No. 60 powder, *five hundred grammes*	**500 Gm.**
Acetone, *a sufficient quantity.*	

Introduce the Ginger into a cylindrical glass percolator, provided with a stop-cock, and arranged with a cover and a receptacle suitable for volatile liquids. Pack the powder firmly, and percolate slowly with Acetone, added in successive portions, until the Ginger is exhausted. Recover the greater part of the Acetone from the percolate by distillation on a water-bath, and, having transferred the residue to a dish, allow the remaining Acetone to evaporate spontaneously in a warm place. Keep the Oleoresin in a well-stoppered bottle.

Average dose.—0.030 Gm. = 30 milligrammes ($\frac{1}{2}$ grain).

OLEUM ADIPIS

Lard Oil

A fixed oil expressed from lard at a low temperature.

A colorless or pale yellow, oily liquid, having a peculiar odor and a bland taste.

Specific gravity: 0.905 to 0.915 at 25° C. (77° F.).

At a temperature a little below 10° C. (50° F.), it usually commences to deposit a white, granular fat, and at or near 0° C. (32° F.), it forms a solid white mass.

Lard oil is almost insoluble in cold alcohol and only slightly soluble in boiling alcohol; easily soluble in ether, chloroform, benzene, and carbon disulphide.

If 5 Cc. of the Oil be thoroughly shaken in a test-tube with 5 Cc. of an alcoholic solution of silver nitrate (made by dissolving 0.1 Gm. of silver nitrate in 10 Cc. of alcohol, and adding 2 drops of nitric acid), and the mixture heated for about five minutes on a water-bath, the Oil should remain nearly or quite colorless, not acquiring a reddish or brown color (absence of more than about 5 percent. of *cotton seed oil*).

The Oil should be completely saponifiable with alcoholic potassium hydroxide T.S. and the resulting soap should be completely soluble in water, without separation of an oily layer (absence of *mineral oils*).

If 2 Cc. of Lard Oil be mixed in a test-tube with 2 Cc. of equal volumes of amyl alcohol and carbon disulphide containing 1 percent. of sulphur in solution, and the test-tube be immersed to one-third or one-half its depth in boiling salt water, no reddish color should develop in from ten to fifteen minutes (absence of *cotton seed oil* or of *certain other fats*).

Lard Oil saponified by alcoholic potassium hydroxide T.S. should show a saponification value of 195 to 197 (see Appendix, Test No. 99).

If 0.3 Gm. of Lard Oil be dissolved in 10 Cc. of chloroform, in a 250 Cc. bottle or flask, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and alcoholic mercuric chloride T.S. added, and if, after standing for four hours protected from the light, 20 Cc. of potassium iodide T.S. be added, and the mixture diluted with 50 Cc. of water, on titrating the excess of iodine with tenth-normal sodium thiosulphate V.S., an iodine value of not less than 56 nor more than 74 should be obtained (see Appendix, Test No. 51).

OLEUM ÆTHEREUM

Ethereal Oil

A volatile liquid consisting of equal volumes of heavy oil of wine and ether.

Alcohol, *one thousand cubic centimeters*	1000 Cc.
Sulphuric Acid, *one thousand cubic centimeters*	1000 Cc.
Distilled Water, *twenty-five cubic centimeters*	25 Cc.
Ether, *a sufficient quantity.*	

Add the Sulphuric Acid slowly to the Alcohol, mix them thoroughly, and allow the mixture to stand, in a closed flask, for twenty-four hours, or until the liquid is clear; then pour the clear liquid into a tubulated retort of such capacity that the mixture shall nearly fill it. Insert a thermometer through the tubulure, so that the bulb shall be deeply immersed in the liquid, and, having connected the retort with a well-cooled condenser, and also having connected with the receiver a bent glass tube for conducting the uncondensed gases into water, distil, by means of a sand-bath, at a temperature between 150° and 160° C. (302° and 320° F.), until oily drops cease to come over, or until a black froth, which forms on the surface, begins to rise in the retort. Separate the yellow, ethereal liquid from the distillate, and expose it to the air for twenty-four hours, in a shallow dish. Then transfer it to a wet filter, and, when the aqueous portion has drained off, wash the oil which is left on the filter with the Distilled Water, which should be as cold as possible. When this also has drained off, transfer the oil to a graduated measure, and add to it an equal volume of Ether. Keep the product in small, glass-stoppered vials, in a cool place.

A transparent, nearly colorless, volatile liquid, of a peculiar, aromatic, ethereal odor, and a pungent, refreshing, bitter taste; neutral to dry litmus paper.

Specific gravity: 0.905 at 25° C. (77° F.).

OLEUM AMYGDALÆ AMARÆ

Oil of Bitter Almond

A volatile oil obtained from Bitter Almond and other seeds c taining amygdalin, yielding, when assayed as directed below, not l than 85 percent. of benzaldehyde, and not less than 2 percent. n more than 4 percent. of hydrocyanic acid. It should be kept in sma well-stoppered, completely filled, amber-colored bottles, protect from light and air.

A clear, colorless or yellow, thin, and strongly refractive liquid, having peculiar aromatic odor, and a bitter and burning taste.

Specific gravity: 1.045 to 1.060 at 25° C. (77° F.).

Boiling point: about 180° C. (356° F.). Optically inactive.

Soluble in 300 parts of water at 25° C. (77° F.), in alcohol or ether in all pr portions, and in an equal volume of 70 percent. alcohol; soluble in nitric aci at ordinary temperatures without the evolution of nitrous vapors.

In the fresh state the Oil is neutral to litmus paper, but when kept for so m time it acquires an acid reaction, due to the formation of benzoic acid, which when isolated and purified, should correspond to the tests given under *Acidu Benzoicum*. Oil of Bitter Almond containing crystals of benzoic acid shou not be dispensed.

If 10 drops of the Oil, dissolved in a little alcohol, be shaken with a few dr of sodium hydroxide T.S., also with 2 drops of ferrous sulphate T.S. and drops of ferric chloride T.S., then warmed, and finally mixed with a sligh excess of hydrochloric acid, a blue precipitate will be produced (presence *hydrocyanic acid*).

If the looped end of a piece of clean copper wire be held in a non-luminous flame until it ceases to give a green color, then cooled, and the loop dipped into Oil of Bitter Almond, ignited and held so that the liquid burns outside of the flame, then if the loop be slowly brought into contact with the lower outer edge of the flame, no green tinge should be discernible (absence of *chlorinated products*).

If a small strip of filter paper, folded in the form of a taper and saturated with Oil of Bitter Almond, be placed in a small porcelain dish, and a clean beaker, moistened on the inner surface with distilled water, be inverted over the small dish immediately after igniting the taper, a part of the products of combustion will be absorbed by the water. If the beaker be then rinsed with a little distilled water and the liquid filtered, the filtrate should yield no turbidity upon the addition of a few drops of silver nitrate T.S., or if a slight turbidity appears, it should entirely disappear upon boiling the liquid (absence of [illegible] containing *chlorinated products*).

Assay for Benzaldehyde

The method to be employed is identical with that given for Benzaldehyde, on page 58, using *twelve drops* of Oil of Bitter Almond.

Assay for Hydrocyanic Acid

Mix, in a 100 Cc. flask, 1 Gm. of the Oil of Bitter Almond to be tested, with sufficient water and freshly precipitated magnesium hydroxide free from chlorides to make an opaque mixture of about 10 Cc. Add to this 2 or 3 drops of potassium chromate T.S., and then, from a burette add tenth-normal silver nitrate V.S. until a red tint is produced which does not again disappear on shaking: not less than 7.5 Cc. nor more than 15 Cc. of tenth-normal silver nitrate V.S. should be required, each Cc. corresponding to 0.0027 Gm. of hydrocyanic acid.

Average dose.—0.03 Cc. ($\frac{1}{2}$ minim).

OLEUM AMYGDALÆ EXPRESSUM

Expressed Oil of Almond

A fixed oil expressed from Bitter or Sweet Almond. It should be kept in well-stoppered containers, in a cool place.

A clear, pale straw-colored or colorless, oily liquid, almost inodorous, and having a mild, nut-like taste.

Specific gravity: 0.910 to 0.915 at 25° C. (77° F.).

Only slightly soluble in alcohol; soluble in ether, chloroform, and benzene in all proportions.

It should remain clear at —10° C. (14° F.), and it does not congeal until cooled to nearly —20° C. (—4° F.) (absence of *olive oil* or *lard oil*).

If 2 Cc. of the Oil be vigorously shaken with a mixture of 1 Cc. of fuming nitric acid and 1 Cc. of water, a whitish mixture should be formed, which, after standing for some hours at about 10° C. (50° F.), should separate into a solid, white mass and a slightly colored liquid (distinction from the fixed oils of *peach* and *apricot kernels*, which give a red color, and *sesame* and *cotton seed oils*, which are colored brown).

If 10 Cc. of the Oil be mixed with 15 Cc. of a solution of sodium hydroxide (1 in 6) and 10 Cc. of alcohol, and the mixture be allowed to stand at a temperature of 35° to 40° C. (95° to 104° F.), with occasional agitation, until it becomes clear, and if then diluted with 100 Cc. of water, the clear solution thus obtained upon the subsequent addition of an excess of hydrochloric acid will set free a layer of oleic acid. This, when separated from the aqueous liquid, washed with warm water, and clarified by heating on a water-bath, will remain liquid if cooled to 15° C. (59° F.).

One volume of this oleic acid, when mixed with 1 volume of alcohol, should yield a clear solution, which at 15° C. (59° F.) should not deposit any fatty acids, nor become turbid upon the further addition of 1 volume of alcohol (distinction from *olive*, *arachis*, *cotton seed*, *sesame*, and *other fixed oils*).

Expressed Oil of Almond, saponified by alcoholic potassium hydroxide T.S., should show a saponification value of 191 to 200 (see Appendix, Test No. 99).

If 0.3 Gm. of Expressed Oil of Almond be dissolved in 10 Cc. of chloroform in a 250 Cc. bottle or flask, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and alcoholic mercuric chloride T.S. added, and if, after standing for four hours protected from the light, 20 Cc. of potassium iodide T.S. be introduced, and the mixture diluted with 50 Cc. of water, on titrating the excess of iodine with tenth-normal sodium thiosulphate V.S., an iodine value of not less than 95 nor more than 100 should be obtained (see Appendix, Test No. 51).

Average dose.— 30 Cc. (1 fluidounce).

OLEUM ANISI

Oil of Anise

A volatile oil distilled from Anise or from the fruit of Star Anise, *Illicium verum* Hooker filius (Fam. *Magnoliaceæ*). It should be kept in well-stoppered, amber-colored bottles, protected from light, and, if it has separated into a liquid and a solid portion, it should be completely liquefied by warming, and then well shaken, before being dispensed.

A colorless or pale yellow, thin, and strongly refractive liquid, having the characteristic odor of anise, and a sweetish, mildly aromatic taste.

Specific gravity: 0.975 to 0.988 at 25° C. (77° F.).

The Oil should be lævogyrate, the angle of rotation being up to —2° in a 100 Mm. tube, at a temperature of 25° C. (77° F.) (absence of *oil of fennel*, etc.).

Soluble in an equal volume of alcohol, forming a clear solution, also in 5 volumes of 90 percent. alcohol (absence of *petroleum*, of *most fixed oils*, and of *oil of turpentine*).

An alcoholic solution of Oil of Anise is neutral to litmus paper, and should not assume a blue or brownish color on the addition of a drop of ferric chloride T.S. (absence of some *volatile oils* containing *phenols*).

When the Oil is shaken with water in a narrow graduated cylinder, its volume should not be diminished (absence of *alcohol*).

When tested according to the following method, the congealing point of Oil of Anise should not be below 15° C. (59° F.):

Transfer about 10 Cc. of the Oil to a test-tube, placed in water cooled with ice; insert a thermometer at once into the Oil, and allow it to remain undisturbed until its temperature has fallen to about 6° C. (42.8° F.). Induce crystallization either by rubbing the inner wall of the test-tube with the thermometer, or by the addition of a particle of solid anethol, remove the test-tube from the bath, and stir continuously during the solidification of the Oil.

The highest temperature reached during the crystallization is regarded as the congealing point.

Average dose.—0.2 Cc. (3 minims).

OLEUM AURANTII CORTICIS

Oil of Orange Peel

A volatile oil obtained by expression from the fresh peel of the Sweet Orange. It should be kept in small, well-stoppered, amber-colored bottles, in a cool place, so as to avoid, as far as possible, the development of a terebinthinate odor. Oils that have developed such an odor should not be dispensed.

A pale yellow liquid, having the characteristic, aromatic odor of orange, and an aromatic taste.

Specific gravity: 0.842 to 0.846 at 25° C. (77° F.).

Its optical rotation should be dextrogyrate, not less than 95° in a 100 Mm. tube, at a temperature of about 25° C. (77° F.) (absence of *oil of turpentine*, etc.).

When subjected to careful fractional distillation, any Oil coming over below 170° C. (338° F.) should not yield pinene nitrosochloride and nitrosopinene (derived from added oil of turpentine) when tested in the following manner:

Dissolve 5 Cc. of the fraction to be tested in one-half its volume of glacial acetic acid, add 5 Cc. of amyl nitrite, cool thoroughly in a freezing mixture, and add, very gradually, 5 Cc. of a mixture of equal volumes of hydrochloric acid and glacial acetic acid. Collect any crystals which separate from the blue or greenish liquid upon standing, on a force filter, and wash them with a little alcohol. Transfer the crystals to a flask, add 5 Cc. of alcoholic potassium hydroxide T.S., and heat on a water-bath fifteen minutes. Pour the solution into cold water, collect the precipitate, and wash it with cold water. Recrystallize the dried precipitate from alcohol, and determine the melting point of the crystals. Nitrosopinene melts at 132° C. (269.6° F.), whereas nitrosolimonene or carvoxime (from limonene, one of the normal constituents of Oil of Orange Peel) melts at 72° C. (161.6° F.).

Average dose.—0.2 Cc. (3 minims).

OLEUM BETULÆ

Oil of Betula

[OLEUM BETULÆ VOLATILE, PHARM. 1890]

A volatile oil obtained by maceration and distillation from the bark of the Sweet Birch, *Betula lenta* Linné (Fam. *Betulaceæ*). It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

It is optically inactive, but otherwise has essentially the same properties as, and conforms to the reactions and tests given under, *Oleum Gaultheriæ*.

Average dose.—1 Cc. (15 minims).

OLEUM CADINUM

Oil of Cade

A product of the dry distillation of the wood of *Juniperus Oxycedrus* Linné (Fam. *Coniferæ*).

A brownish or dark brown, clear, thick liquid, having a tarry odor, and an empyreumatic, burning, somewhat bitter taste.

It is almost insoluble in water, but imparts to it an acid reaction; it is only partially soluble in alcohol, but it is completely soluble in ether.

OLEUM CAJUPUTI

Oil of Cajuput

A volatile oil distilled from the fresh leaves and twigs of *Melaleuca Leucadendron* Linné (Fam. *Myrtaceæ*), yielding, when assayed by the process given below, not less than 55 percent., by volume, of cineol. It should be kept in well-stoppered, amber-colored bottles, in a cool place.

A thin, colorless or greenish liquid, having a peculiar, agreeable, distinctly camphoraceous odor, and an aromatic, slightly bitter taste.

Specific gravity: 0.915 to 0.925 at 25° C. (77° F.).

It is miscible with alcohol in all proportions, also soluble in 1 part of 80 percent. alcohol. The alcoholic solution should be neutral.

Oil of Cajuput is lævogyrate; the angle of rotation should not exceed —2° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

On shaking 5 Cc. of the Oil with 5 Cc. of water containing 1 drop of diluted hydrochloric acid, a reddish-brown color should not be produced in the acid liquid when separated from the Oil, if a drop of potassium ferrocyanide T.S. be added (absence of *copper*).

Assay for Cineol

Introduce into a beaker a solution prepared by dissolving 10 Cc. of Oil of Cajuput in 50 Cc. of purified petroleum benzin; immerse the beaker in a freezing mixture and add phosphoric acid, drop by drop, with constant stirring, until the white magma of cineol phosphate formed, begins to assume a yellowish or pinkish tint; then transfer the magma to a force filter, wash it with cold purified petroleum benzin, and then dry it by pressure between two porous plates. Transfer the precipitate (cineol phosphate) to a narrow graduated cylinder, and add warm water, which will cause separation of the cineol. The volume, in cubic centimeters, of the separated oily liquid, multiplied by 10, represents the volume percent. of cineol.

Average dose.— 0.5 Cc. (8 minims).

OLEUM CARI

Oil of Caraway

A volatile oil distilled from Caraway and rectified by steam distillation. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or pale yellow, thin liquid, having the characteristic, aromatic odor of caraway, and a spicy taste.

Specific gravity: 0.900 to 0.910 at 25° C. (77° F.).

Soluble in an equal volume of alcohol; also in from 3 to 10 volumes of 80 percent. alcohol.

Oil of Caraway is dextrogyrate, the angle of rotation varying from +70° to +80° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Average dose.— 0.2 Cc. (3 minims).

OLEUM CARYOPHYLLI

Oil of Cloves

A volatile oil distilled from Cloves, yielding, when assayed by the process given below, not less than 80 percent., by volume, of eugenol. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or pale yellow, thin liquid, becoming darker and thicker by age and exposure to the air, having a strongly aromatic odor of cloves, and a pungent and spicy taste.

Specific gravity: 1.040 to 1.060 at 25° C. (77° F.).

Soluble in an equal volume of alcohol, this solution being slightly acid to litmus paper; also soluble in about 2 volumes of 70 percent. alcohol.

When shaken with an equal volume of a concentrated solution of potassium hydroxide, or of stronger ammonia water, it forms a semi-solid, yellowish mass.

If 2 drops of the Oil be dissolved in 4 Cc. of alcohol, and a drop of ferric chloride T.S. added, a bright green color will be produced; and if the same test be made with a drop of diluted ferric chloride T.S., prepared by diluting the test solution with four times its volume of water, a blue color will be produced, which soon changes to yellow.

If 1 Cc. of the Oil be shaken with 20 Cc. of hot water, the water should show a scarcely perceptible acid reaction to litmus paper. If, after cooling, the aqueous layer be passed through a wet filter, the clear filtrate should yield, with a drop of ferric chloride T.S., only a transient, grayish-green, but not a blue or violet color (absence of *phenol*).

Assay for Eugenol

Introduce into a flask with a long neck (graduated in tenths) 10 Cc. of the Oil of Cloves and 100 Cc. of potassium hydroxide T.S., and shake the mixture for five minutes. When the liquids have separated completely, add sufficient ssium hydroxide T.S. to raise the lower limit of the oily layer to the zero mark of the scale, and note the volume of the residual liquid, which should not measure more than 2 Cc., indicating the presence of at least 80 percent. of eugenol.

Average dose.— 0.2 Cc. (3 minims).

OLEUM CHENOPODII

Oil of Chenopodium

A volatile oil distilled from *Chenopodium anthelminticum* Linné (Fam. *Chenopodiaceæ*). It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A thin, colorless or yellow liquid, having a peculiar, penetrating, somewhat camphoraceous odor, and a pungent and slightly bitter taste.

Average dose.— 0.2 Cc. (3 minims).

OLEUM CINNAMOMI

Oil of Cinnamon Oil of Cassia

A volatile oil distilled from Cassia Cinnamon (Fam. *Lauraceæ*), yielding, when assayed by the process given below, not less than 75 percent., by volume, of cinnamic aldehyde. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A yellowish or brownish liquid, becoming darker and thicker by age and exposure to the air, having the characteristic odor of cinnamon, and a sweetish, spicy, and burning taste.

Specific gravity: 1.045 to 1.055 at 25° C. (77° F.). The Oil (or if it be dark, its distillate) should be optically almost inactive; it should not be more than one degree dextrogyrate or lævogyrate when viewed through a 100 Mm. tube.

Soluble in 2 volumes of 70 percent. alcohol.

When shaken with a saturated solution of sodium bisulphite, it solidifies to a crystalline mass.

If 4 drops of the Oil, contained in a test-tube, be cooled to 0° C. (32° F.), and then shaken with 4 drops of fuming nitric acid, crystalline needles or plates will be formed.

If a portion of the oil be shaken with hydrogen sulphide T.S., it should not assume a dark color (absence of *lead* and *copper*).

If 1 Cc. of the Oil be mixed with 3 Cc. of a mixture of 3 volumes of alcohol and 1 volume of water, a clear solution should result; and if to this solution there be gradually added 2 Cc. of a saturated solution of lead acetate in a mixture of 3 volumes of alcohol and 1 volume of water, no precipitate should be produced (absence of *petroleum* and of *rosin*).

Assay for Cinnamic Aldehyde

Introduce into a flask with a long graduated neck (cassia-flask), by means of a measuring-pipette, 10 Cc. of the Oil of Cinnamon, add 10 Cc. of a 30 percent. solution of sodium bisulphite, shake the flask, and heat it in a water-bath containing boiling water until the contents are liquefied; add successive portions

(10 Cc. each) of the bisulphite solution, shaking and heating as before, after each addition, until the flask is three-fourths filled. Continue to heat it in the water-bath until the odor of cinnamic aldehyde is no longer perceptible, cool the flask to about 25° C. (77° F.), and add enough of the bisulphite solution to raise the lower limit of the oily layer to the zero mark of the scale. The residual liquid should not measure more than 2.5 Cc., corresponding to at least 75 percent., by volume, of cinnamic aldehyde.

Average dose.—0.05 Cc. (1 minim).

OLEUM COPAIBÆ

Oil of Copaiba

A volatile oil distilled from Copaiba. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or pale yellow liquid, having the characteristic odor of copaiba, and an aromatic, slightly bitter, and pungent taste.

Specific gravity: 0.895 to 0.905 at 25° C. (77° F.), increasing with age. It is lævogyrate.

Average dose.—0.5 Cc. (8 minims).

OLEUM CORIANDRI

Oil of Coriander

A volatile oil distilled from Coriander. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or slightly yellow liquid, having the characteristic, aromatic odor, of coriander, and a warm, spicy taste.

Specific gravity: 0.863 to 0.878 at 25° C. (77° F.).

It should be soluble in 3 volumes of 70 percent. alcohol; also soluble in all proportions in 80 percent. and 90 percent. alcohol.

It is dextrogyrate, the angle of rotation varying from +7° to +14° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Average dose.—0.2 Cc. (3 minims).

OLEUM CUBEBÆ

Oil of Cubeb

A volatile oil distilled from Cubeb. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless, pale green, or yellow liquid, having the characteristic odor of cubeb, and a warm, camphoraceous, aromatic taste.

Specific gravity: 0.905 to 0.925 at 25° C. (77° F.).

An alcoholic solution of Oil of Cubeb is neutral to litmus paper.

It is lævogyrate, the angle of rotation varying from —25° to —40° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Average dose.—0.5 Cc. (8 minims).

OLEUM ERIGERONTIS

Oil of Erigeron

A volatile oil distilled from the fresh, flowering herb of *Erigeron canadensis* Linné (Fam. *Compositæ*). It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A pale yellow, limpid liquid, rapidly becoming darker and thicker by age and exposure to the air, having a peculiar, aromatic, persistent odor, and an aromatic, slightly pungent taste.

Specific gravity : 0.845 to 0.865 at 25° C. (77° F.)

Soluble in an equal volume of alcohol (distinction from *oil of fireweed* derived from *Erechthites hieracifolia* Rafinesque (Fam. *Compositæ*) and from *oil of turpentine*).

It is dextrogyrate, the angle of rotation being not below +45° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Average dose.—1 Cc. (15 minims).

OLEUM EUCALYPTI

Oil of Eucalyptus

A volatile oil distilled from the fresh leaves of Eucalyptus, rectified by steam distillation, and yielding, when assayed by the process given below, not less than 50 percent., by volume, of cineol (eucalyptol). It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or pale yellow liquid, having a characteristic, aromatic, somewhat camphoraceous odor, and a pungent, spicy, and cooling taste.

Specific gravity : 0.905 to 0.925 at 25° C. (77° F.).

Soluble, in all proportions, in alcohol; also soluble in 3 volumes of 70 percent. alcohol.

Its alcoholic solution should be neutral to litmus paper.

It is dextrogyrate, the angle of rotation being not more than +10° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

If 2 Cc. of the Oil be mixed with 4 Cc. of glacial acetic acid, and 3 Cc. of a saturated, aqueous solution of sodium nitrite be gradually added, the mixture, when gently stirred, should not form crystals of phellandrene nitrite (absence of *eucalyptus oils* containing much *phellandrene*).

Assay for Cineol

Introduce into a beaker a solution prepared by dissolving 10 Cc. of Oil of Eucalyptus in 50 Cc. of purified petroleum benzin; immerse the beaker in a freezing mixture and add phosphoric acid, drop by drop, with constant stirring, until the white magma of cineol phosphate formed, begins to assume a yellowish or pinkish tint; then transfer the magma to a force filter, wash it with cold purified petroleum benzin, and then dry it by pressure between two porous plates. Transfer the precipitate (cineol phosphate) to a narrow graduated cylinder, and add warm water, which will cause separation of the cineol. The volume, in cubic centimeters, of the separated oil, multiplied by 10, represents the volume percent. of cineol (eucalyptol). This should correspond to the properties and tests given under *Eucalyptol.*

Average dose.— 0.5 Cc. (8 minims).

OLEUM FŒNICULI

Oil of Fennel

A volatile oil distilled from Fennel. It should be kept in well-stoppered, amber-colored bottles, in a cool place, and, if it has partly or wholly solidified, it should be completely liquefied by warming and then well shaken before being dispensed.

A colorless or pale yellow liquid, having the characteristic, aromatic odor of fennel, and a sweetish, mild, and spicy taste.

Specific gravity: 0.953 to 0.973 at 25° C. (77° F.).

Soluble in an equal volume of alcohol, the solution being neutral to litmus paper, also soluble in 10 volumes or less of 80 percent. alcohol.

An alcoholic solution of Oil of Fennel is neutral to litmus paper, and is not colored by the addition of a drop of ferric chloride T.S. (absence of some volatile oils containing *phenols*).

When tested according to the following method, the congealing point of Oil of Fennel should not be below 5° C. (41° F.):

Transfer about 10 Cc. of the Oil to a test-tube placed in a freezing mixture; insert a thermometer at once into the Oil, and allow it to remain undisturbed until its temperature has fallen to about —3° C. (26.6° F.). Induce crystallization either by rubbing the inner wall of the test-tube with the thermometer or by the addition of a particle of solid anethol, and stir continuously during the solidification of the Oil. The highest temperature reached during the crystallization is regarded as the congealing point.

Average dose.— 0.2 Cc. (3 minims).

OLEUM GAULTHERIÆ

Oil of Gaultheria

A volatile oil distilled from the leaves of *Gaultheria procumbens* Linné (Fam. *Ericaceæ*), rectified, if necessary, by steam distillation. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or almost colorless liquid, having a characteristic, strongly aromatic odor, and a sweetish, warm, and aromatic taste.

Specific gravity: 1.172 to 1.180 at 25° C. (77° F.).

Boiling point: 218° to 221° C. (424.4° to 429.8° F.).

It is slightly lævogyrate, up to —1° in a 100 Mm. tube, at 25° C. (77° F.).

In other respects it has the same properties as, and conforms to the reactions and tests given under, *Methylis Salicylas*.

Average dose.—1 Cc. (15 minims).

OLEUM GOSSYPII SEMINIS

Cotton Seed Oil

A fixed oil expressed from the seeds of *Gossypium herbaceum* Linné, or of other species of *Gossypium* (Fam. *Malvaceæ*), and subsequently purified. It should be kept in well-closed containers.

A pale yellow, oily liquid, without odor, and having a bland, nut-like taste.

Specific gravity: 0.915 to 0.921 at 25° C. (77° F.).

Very sparingly soluble in alcohol, but readily soluble in ether, chloroform, or carbon disulphide.

On cooling the Oil to a temperature below 12° C. (53.6° F.), particles of solid fat will separate. At about 0° to —5° C. (32° to 23° F.), the Oil becomes nearly or quite solid.

If sulphuric acid (specific gravity 1.6 to 1.7) be added to the Oil, preferably diluted with carbon disulphide, a reddish-brown color is rapidly produced.

If 6 Gm. of the Oil be thoroughly shaken in a test-tube for about ten minutes with a mixture of 1.5 Gm. of nitric acid and 0.5 Gm. of water, then heated in a bath of boiling water for not more than fifteen minutes, the Oil will assume an orange or reddish-brown color, and after standing for twelve hours at the ordinary temperature, will form a semi-solid mass.

If 5 Cc. of the Oil be thoroughly shaken in a test-tube with 5 Cc. of an alcoholic solution of silver nitrate (made by dissolving 0.1 Gm. of silver nitrate in 10 Cc. of alcohol and adding 2 drops of nitric acid), and if the mixture be heated for about five minutes on a water-bath, the Oil will assume a red or reddish-brown color.

If 2 Cc. of the Oil be mixed in a test-tube with 2 Cc. of equal volumes of amyl alcohol and carbon disulphide containing 1 percent. of sulphur in solution, and the test-tube be immersed to one-third or one-half its depth in boiling salt water, a red color will develop in from ten to fifteen minutes.

Cotton Seed Oil saponified by alcoholic potassium hydroxide T.S. should show a saponification value of from 191 to 196 (see Appendix, Test No. 99).

If 0.3 Gm. of Cotton Seed Oil be dissolved in 10 Cc. of chloroform, in a 250 Cc. bottle or flask, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and alcoholic mercuric chloride T.S. added, and if, after standing for four hours protected from the light, 20 Cc. of potassium iodide T.S. be introduced, and the mixture diluted with 50 Cc. of water, on titrating the excess of iodine with tenth-normal sodium thiosulphate V.S. an iodine value of not less than 102 nor more than 108 should be obtained (see Appendix, Test No. 51).

Average dose.— 16 Cc. (4 fluidrachms).

OLEUM HEDEOMÆ

Oil of Hedeoma

A volatile oil distilled from the leaves and flowering tops of Hedeoma. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A pale yellow, limpid liquid, having a characteristic, pungent, mint-like odor and taste.

Specific gravity: 0.920 to 0.935 at 25° C. (77° F.).

It should form a clear solution with 2 volumes or more of 70 percent. alcohol.

It is dextrogyrate, the angle of rotation varying from about +18° to +22° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Average dose.— 0.2 Cc. (3 minims).

OLEUM JUNIPERI

Oil of Juniper

A volatile oil distilled from the fruit of *Juniperus communis* Linné (Fam. *Coniferæ*). It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless, faintly green or yellow liquid, having the characteristic odor of juniper, and a warm, aromatic, somewhat terebinthinate and slightly bitter taste.

Specific gravity: 0.860 to 0.880 at 25° C. (77° F.).

Average dose.—0.2 Cc. (3 minims).

OLEUM LAVANDULÆ FLORUM

Oil of Lavender Flowers

A volatile oil distilled from the fresh flowering tops of *Lavandula officinalis* Chaix (Fam. *Labiatæ*). It should be kept in amber-colored, well-stoppered bottles, in a cool place, protected from light.

A colorless or yellow liquid, having the fragrant odor of lavender flowers, and a pungent and slightly bitter taste.

Specific gravity: 0.875 to 0.910 at 25° C. (77° F.).

It is soluble in 3 parts of 70 percent. alcohol.

When the oil is shaken with water in a narrow graduated cylinder, its volume should not be diminished (absence of *alcohol*).

Average dose.—0.2 Cc. (3 minims).

OLEUM LIMONIS

Oil of Lemon

A volatile oil obtained by expression from fresh Lemon Peel, yielding, when assayed by the process given below, not less than 4 percent. of aldehyde, calculated as citral. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A pale yellow, limpid liquid, having the fragrant odor of lemon, and an aromatic, somewhat bitter taste.

Specific gravity: 0.851 to 0.855 at 25° C. (77° F.).

It is dextrogyrate; its optical rotation should not be less than +58° in a 100 Mm. tube, at a temperature of 25° C. (77° F.). The angle of rotation of the first 10 percent. of Oil obtained by fractional distillation should not differ more than 2° from that of the original Oil.

Assay for Citral

Introduce into a counterpoised 150 Cc. flask, by means of a pipette, about 15 Cc. of Oil of Lemon, and note the exact weight; add 5 Cc. of distilled water and a few drops of rosolic acid T.S., and then neutralize the liquid exactly by the cautious addition of tenth-normal sodium hydroxide V.S. Add 25 Cc. of a neutral solution of sodium sulphite (1 in 5), and immerse the flask in a water-bath containing boiling water. From a burette add, as needed, just sufficient half-normal hydrochloric acid V.S. to maintain the neutrality of the mixture, keeping the flask continuously heated and frequently agitated, and adding a drop or two of rosolic acid T.S. When a permanent condition of neutrality is reached, note the number of cubic centimeters of the half-normal hydrochloric acid V.S. consumed. Carry out a blank test, identical with the foregoing, except that the Oil of Lemon is omitted, and note the amount of half-normal hydrochloric acid V.S. consumed. Subtract the number of cubic centimeters required in the blank test from the number required in the original test; each Cc. of this difference corresponds to 0.03802 Gm. of citral. To find the percentage, multiply the above difference by 0.03802, and this product by 100, and divide by the weight of the Oil of Lemon taken.

Average dose.— 0.2 Cc. (3 minims).

OLEUM LINI

Linseed Oil

A fixed oil expressed from Linseed. It should be kept in well-stoppered containers. Linseed Oil which has been "boiled" should not be used nor dispensed.

A yellowish, oily liquid, having a peculiar odor and a bland taste. When exposed to the air, it gradually thickens, darkens in color, and acquires a strong odor and taste; if spread in a thin layer on a glass plate and allowed to stand in a warm place, it is gradually converted into a hard, transparent resin (absence of *non-drying oils*).

Specific gravity: 0.925 to 0.935 at 25° C. (77° F.).

It does not congeal at temperatures above —20° C. (—4° F.).

It is soluble in about 10 parts of absolute alcohol, and in all proportions in ether, chloroform, petroleum benzin, carbon disulphide, and oil of turpentine.

It should not more than slightly redden blue litmus paper previously moistened with alcohol (limit of *free acid*).

The Oil should be completely saponifiable with alcoholic potassium hydroxide T.S., and the resulting soap should be completely soluble in water without leaving an oily residue (absence of *mineral oils* and *rosin oil*).

If 2 Cc. of the Oil be warmed and shaken in a test-tube with an equal volume of glacial acetic acid, and if to this mixture, after cooling, 1 drop of sulphuric acid be added, a greenish color should be produced (a violet color under these circumstances indicates the presence of *rosin* or *rosin oils*).

Linseed Oil saponified by alcoholic potassium hydroxide T.S. should show a saponification value of from 187 to 195 (see Appendix, Test No. 99).

If 0.15 Gm. of Linseed Oil be dissolved in 10 Cc. of chloroform in a 250 Cc. flask, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and alcoholic mercuric chloride T.S. added, and if, after standing for sixteen hours protected from the light, 20 Cc. of potassium iodide T.S. be introduced and the mixture diluted with 50 Cc. of water, on titrating the excess of iodine with tenth-normal sodium thiosulphate V.S., an iodine value of not less than 170 should be obtained (see Appendix, Test No. 51).

Average dose.— 30 Cc. (1 fluidounce).

OLEUM MENTHÆ PIPERITÆ

Oil of Peppermint

A volatile oil distilled from the fresh or partly dried leaves and flowering tops of Peppermint, rectified by steam distillation, and yielding, when assayed by the process given below, not less than 6 percent. of ester, calculated as menthyl acetate, and not less than 50 percent. of total menthol (free and as ester). It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless liquid, having the characteristic, strong odor of peppermint, and a strongly aromatic, pungent taste, followed by a sensation of cold when air is drawn into the mouth.

Specific gravity: 0.894 to 0.914 at 25° C. (77° F.).

It forms a clear solution, neutral to litmus paper, with an equal volume of alcohol; also soluble in 4 volumes of 70 percent. alcohol, the solution showing not more than a slight opalescence.

It is laevogyrate, the angle of rotation varying from —20° to —33° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

If from 25 Cc. of Oil about 1 Cc. be distilled and the distillate poured on an aqueous solution of mercuric chloride, a white film should not form at the zone of contact after a short time (*absence of dimethyl sulphide* found in non-rectified oils).

Assay

Introduce into a tared flask 10 Cc. of Oil of Peppermint, and note the exact weight; add 25 Cc. of half-normal alcoholic potassium hydroxide V.S., connect with a reflux condenser, and boil the mixture during one hour. After cooling, titrate the residual alkali with half-normal sulphuric acid V.S., using phenolphthalein T.S. as indicator. Subtract the number of cubic centimeters of half-normal sulphuric acid V.S. required from the 25 Cc. of half-normal alcoholic potassium hydroxide V.S. taken, multiply the difference by 9.884, and divide the product by the weight of the Oil of Peppermint taken to find the percentage of menthyl acetate. Wash the residual oil repeatedly with water, transfer it to a flask provided with a ground-glass tube-condenser (acetylization flask), add 10 Cc. of acetic acid anhydride and about 1 Gm. of anhydrous sodium acetate, and boil gently during one hour. Allow it to cool, wash the acetylized oil with distilled water, and afterwards with sodium hydroxide T.S., until the mixture is slightly alkaline to phenolphthalein T.S., and then dry it with the aid of fused calcium chloride, and filter.

Transfer to a tared 100 Cc. flask 5 Cc. of the dry acetylized oil, note the exact weight, add 50 Cc. of half normal alcoholic potassium hydroxide V.S., connect with a reflux condenser, and boil the mixture during one hour. After cooling, titrate the residual alkali with half-normal sulphuric acid V.S., using phenolphthalein T.S. as indicator. Subtract the number of cubic centimeters of half-normal sulphuric acid V.S. required from the 50 Cc. of half-normal alcoholic potassium hydroxide V.S. taken, multiply the difference by 7.749, and divide the product by the weight of the dry acetylized oil taken, less the above difference multiplied by 0.021; the quotient will represent the percentage of menthol in the Oil of Peppermint.

NOTE.—The difference referred to above represents the number of cubic centimeters of half-normal alcoholic potassium hydroxide V.S. consumed by the acetylized oil.

Average dose.—0.2 Cc. (3 minims).

OLEUM MENTHÆ VIRIDIS

Oil of Spearmint

A volatile oil distilled from the fresh or partly dried leaves and flowering tops of Spearmint, rectified by steam distillation. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless, yellow, or greenish-yellow liquid, having the characteristic, strong odor of spearmint, and a hot, aromatic taste.

Specific gravity: 0.914 to 0.934 at 25° C. (77° F.).

With an equal volume of 80 percent. alcohol it forms a clear solution, which upon further dilution becomes turbid.

It is laevogyrate, the angle of rotation varying from —35° to —48° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Average dose.—0.2 Cc. (3 minims).

OLEUM MORRHUÆ

Cod Liver Oil

A fixed oil obtained from the fresh livers of *Gadus morrhua* Linné, and of other species of *Gadus*. It should be kept in a cool place, in well-stoppered bottles, which have been thoroughly dried before filling.

A pale yellow, thin, oily liquid, having a peculiar, slightly fishy, but not rancid odor, and a bland, fishy taste.

Specific gravity: 0.918 to 0.922 at 25° C. (77° F.).

Very slightly soluble in alcohol, but readily soluble in ether, chloroform, or carbon disulphide; also in 2.5 parts of acetic ether.

If 1 drop of the Oil be dissolved in 20 drops of chloroform and the solution shaken with 1 drop of sulphuric acid, the solution will acquire a violet-red tint, rapidly changing to rose-red and, finally, brownish-yellow.

If a glass rod moistened with sulphuric acid be drawn through a few drops of the Oil, on a porcelain plate, a violet color will be produced.

Cod Liver Oil should be only very slightly acid to blue litmus paper which has been previously moistened with alcohol (limit of *free fatty acids*).

If 2 or 3 drops of fuming nitric acid be allowed to flow alongside of 10 or 15 drops of the Oil, contained in a watch-glass, a red color will be produced at the point of contact. On stirring the mixture with a glass rod, this color becomes bright rose-red, soon changing to lemon-yellow (distinction from *seal oil*, which shows at first no change of color, and from *other fish oils*, which become at first blue and afterwards brown and yellow).

Cod Liver Oil, saponified by alcoholic potassium hydroxide T.S. should show a saponification value of 175 to 185 (see Appendix, Test No. 99).

If 0.3 Gm. of Cod Liver Oil be dissolved in 10 Cc. of chloroform in a 250 Cc. flask or bottle, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and alcoholic mercuric chloride T.S. added, and if, after standing for four hours, protected from light, 20 Cc. of potassium iodide T.S. be introduced, and the mixture diluted with 50 Cc. of water, on titrating the excess of iodine with tenth-normal sodium thiosulphate V.S., an iodine value of not less than 140 nor more than 150 should be obtained (see Appendix, Test No. 51).

Average dose.— 16 Cc. (4 fluidrachms).

OLEUM MYRISTICÆ

Oil of Myristica

A volatile oil distilled from Myristica. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A thin, colorless or pale yellow liquid, having a characteristic odor of nutmeg, and a warm, spicy taste.

Specific gravity: 0.884 to 0.924 at 25° C. (77° F.).

Soluble in an equal volume of alcohol; also soluble in 3 volumes of 90 percent. alcohol.

Oil of Myristica is dextrogyrate.

When 2 or 3 Cc. of Oil are evaporated on a water-bath, no residue which crystallizes on cooling should be left.

Average dose.— 0.2 Cc. (3 minims).

OLEUM OLIVÆ

Olive Oil

A fixed oil expressed from the ripe fruit of *Olea europæa* Linné (Fam. *Oleaceæ*). It should be kept in well-stoppered bottles, in a cool place.

A pale yellow or light greenish-yellow oily liquid, having a slight peculiar odor, and a nut-like, oleaginous taste, with a faintly acrid after-taste.

Specific gravity: 0.910 to 0.915 at 25° C. (77° F.).

Very sparingly soluble in alcohol, but readily soluble in ether, chloroform, or carbon disulphide.

When cooled to from 8° to 10° C. (46.4° to 50° F.), the Oil becomes somewhat cloudy from the separation of crystalline particles, and at 0° C. (32° F.), it forms a whitish, granular mass.

If 2 Cc. of Olive Oil be shaken vigorously with an equal volume of nitric acid (sp. gr. 1.37), the Oil should retain a light yellow color, not becoming orange or reddish-brown, and after standing for six hours should change into a yellowish-white solid mass and an almost colorless liquid (absence of appreciable quantities of *cotton seed oil* and *most other seed oils*).

If 5 Cc. of the Oil be thoroughly shaken in a test-tube with 5 Cc. of an alcoholic solution of silver nitrate (made by dissolving 0.1 Gm. of silver nitrate in 10 Cc. of alcohol and adding 2 drops of nitric acid), and the mixture be heated for about five minutes in a water-bath, the Oil should retain its original pale color, not becoming reddish or brown, nor should any dark color be produced at the line of contact of the two liquids (absence of more than about 5 percent. of *cotton seed oil*).

If 2 Cc. of the Oil be mixed in a test-tube with 2 Cc. of equal volumes of amyl alcohol and carbon disulphide containing 1 percent. of sulphur in solution, and the test-tube be immersed to one-third or one-half its depth in boiling salt water, no reddish color should develop in from ten to fifteen minutes (absence of *cotton seed oil*).

If 2 Cc. of the Oil be mixed with 1 Cc. of hydrochloric acid (sp. gr. 1.18) containing 1 percent. of sugar, and the mixture be shaken for half a minute and allowed to stand for five minutes, and then 3 Cc. of water added and the whole again shaken, the acid layer should not show a pink color (absence of *sesame oil*).

Olive Oil, saponified by alcoholic potassium hydroxide T.S. should show a saponification value of 191 to 195 (see Appendix, Test No. 99).

If 0.3 Gm. of Olive Oil be dissolved in 10 Cc. of chloroform, in a 250 Cc. bottle or flask, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and alcoholic mercuric chloride T.S. added, and if, after standing for four hours, protected from light, 20 Cc. of potassium iodide T.S. be introduced, and the mixture diluted with 50 Cc. of water, on titrating the excess of iodine with tenth-normal sodium thiosulphate V.S., an iodine value of not less than 80 nor more than 88 should be obtained (see Appendix, Test No. 51).

Average dose.—30 Cc. (1 fluidounce).

OLEUM PICIS LIQUIDÆ

Oil of Tar

A volatile oil distilled from tar.

An almost colorless liquid when freshly distilled, but soon acquiring a dark reddish-brown color, and having a strong, tarry odor and taste.

Specific gravity: about 0.892 at 25° C. (77° F.).

It is soluble in alcohol, the solution showing an acid reaction to litmus paper.

Average dose.— 0.2 Cc. (3 minims).

OLEUM PIMENTÆ

Oil of Pimenta

A volatile oil distilled from Pimenta, yielding, when assayed by the process given below, not less than 65 percent., by volume, of eugenol. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless, yellow, or reddish liquid, having a strong, aromatic odor of allspice, and a pungent, spicy taste.

Specific gravity: 1.028 to 1.048 at 25° C. (77° F.).

With 90 percent. alcohol it is miscible in all proportions. It is also soluble in 2 volumes of 70 percent. alcohol.

When mixed with an equal volume of a concentrated solution of sodium hydroxide, it forms a semi-solid mass.

Assay for Eugenol

Introduce into a flask with a long neck (graduated in tenths) 10 Cc. of the Oil of Pimenta and 100 Cc. of potassium hydroxide T.S., and shake the mixture for five minutes. When the liquids have separated completely, add sufficient potassium hydroxide T.S. to raise the lower limit of the oily layer to the zero mark of the scale, and note the volume of residual liquid, which should not measure more than 3.5 Cc., indicating the presence of at least 65 percent. of eugenol.

Average dose.— 0.2 Cc. (3 minims).

OLEUM RICINI

Castor Oil

A fixed oil expressed from the seed of *Ricinus communis* Linné (Fam. *Euphorbiaceæ*). It should be kept in well-stoppered containers.

A pale yellowish or almost colorless, transparent, viscid liquid, having a faint, mild odor, and a bland, afterwards slightly acrid and generally offensive taste.

Specific gravity: 0.945 to 0.965 at 25° C. (77° F.).

Soluble in an equal volume of alcohol, and in all proportions in absolute alcohol or in glacial acetic acid; also soluble, at 25° C. (77° F.), in 3 times its volume of 92.5 percent. alcohol (absence of more than about 5 percent. of *most other fixed oils*).

With an equal volume of petroleum benzin, it forms at 15° C. (59° F.) a turbid mixture, but at 17° C. (62.6° F.) it yields a clear solution.

When cooled to 0° C. (32° F.) it becomes turbid, with the separation of crystalline flakes, and at about —18° C. (—0.4° F.) it congeals to a yellowish mass.

If 3 Cc. of the Oil be shaken for a few minutes with 3 Cc. of carbon disulphide and 1 Cc. of sulphuric acid, the mixture should not acquire a blackish-brown color (absence of *foreign oils*).

Castor Oil saponified by alcoholic potassium hydroxide T.S. should show a saponification value of 179 to 183 (see Appendix, Test No. 99).

If 0.3 Gm. of Castor Oil be dissolved in 10 Cc. of chloroform, in a 250 Cc. bottle or flask, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and

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kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or pale yellow, limpid liquid, having the characteristic, pungent odor of rosemary, and a warm, somewhat camphoraceous taste.

Specific gravity: 0.894 to 0.912 at 25° C. (77° F.).

The Oil should be dextrogyrate, the angle of rotation being not more than +15° in a 100 Mm. tube, at a temperature of 25° C. (77° F.). The first 10 percent. obtained by fractional distillation should also be dextrogyrate.

Soluble in about one-half volume or more of 90 percent. alcohol; also in 2 to 10 volumes of 80 percent. alcohol.

Assay

Introduce into a tared flask 10 Cc. of Oil of Rosemary, and note the exact weight; add 25 Cc. of half-normal alcoholic potassium hydroxide V.S., connect with a reflux condenser, and boil the mixture during one hour. After cooling, titrate the residual alkali with half-normal sulphuric acid V.S., using phenolphthalein T.S. as indicator. Subtract the number of cubic centimeters of half-normal sulphuric acid V.S. required from the 25 Cc. of half-normal alcoholic potassium hydroxide V.S. taken, multiply the difference by 9.734, and divide the product by the weight of the Oil of Rosemary taken to find the percentage of bornyl acetate. Wash the residual oil repeatedly with water, transfer it to a flask provided with a ground-glass tube-condenser (acetylization flask), add 10 Cc. of acetic acid anhydride and about 1 Gm. of anhydrous sodium acetate, and boil gently during one hour. Allow it to cool, wash the acetylized oil with distilled water, and afterwards with sodium hydroxide T.S., until the mixture is slightly alkaline to phenolphthalein T.S., and then dry it with the aid of fused calcium chloride, and filter.

Transfer to a tared 100 Cc. flask 5 Cc. of the dry acetylized oil, note the exact weight, add 50 Cc. of half-normal alcoholic potassium hydroxide V.S., connect with a reflux condenser, and boil the mixture during one hour. After cooling, titrate the residual alkali with half-normal sulphuric acid V.S., using phenolphthalein T.S. as indicator. Subtract the number of cubic centimeters of half-normal sulphuric acid V.S. required from the 50 Cc. of half-normal alcoholic potassium hydroxide V.S. taken, multiply the difference by 7.649, and divide the product by the weight of the dry acetylized oil taken, less the above difference multiplied by 0.021; the quotient will represent the percentage of borneol in the Oil of Rosemary.

NOTE.—The difference referred to above represents the number of cubic centimeters of half-normal alcoholic potassium hydroxide V.S. consumed by the acetylized oil.

Average dose.— 0.2 Cc. (3 minims).

OLEUM SABINÆ

Oil of Savin

A volatile oil distilled from the fresh tops of Savin. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or yellowish liquid, having a peculiar terebinthinate odor, and a pungent, bitter, and camphoraceous taste.

Specific gravity: 0.903 to 0.923 at 25° C. (77° F.).

The Oil is dextrogyrate, the angle of rotation varying between +40° and +60° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Soluble in about one-half volume or more of 90 percent. alcohol.

Average dose.— 0.05 Cc. (1 minim).

OLEUM SANTALI

Oil of Santal

A volatile oil distilled from the wood of *Santalum album* Linné (Fam. *Santalaceæ*), yielding, when assayed by the process given below, not less than 90 percent. of alcohols, calculated as santalol. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A pale yellow, somewhat thick liquid, having a peculiar, aromatic odor, and a pungent, spicy taste.

Specific gravity: 0.965 to 0.980 at 25° C. (77° F.).

The Oil is lævogyrate; its angle of rotation should be not less than —16° nor more than —20° in a 100 Mm. tube, at a temperature of 25° C. (77° F.) (absence *of other varieties of sandalwood oil*, etc.).

Readily soluble in alcohol, the solution being slightly acid to blue litmus paper. It is soluble in 5 volumes of 70 percent. alcohol.

The presence of chloroform may be detected in the following manner: If a small strip of filter paper folded in the form of a taper and saturated with Oil of Santal be placed in a small porcelain dish, and a clean beaker, moistened on the inner surface with distilled water, be inverted over the small dish immediately after igniting the taper, a part of the products of combustion will be absorbed by the water; if the beaker be then rinsed with a little distilled water and the liquid filtered, the filtrate should yield no turbidity upon the addition of a few drops of silver nitrate T.S. (absence of *chlorinated products*).

Assay for Santalol

Introduce 10 Cc. of Oil of Santal into a flask provided with a ground-glass tube-condenser (acetylization flask), add 10 Cc. of acetic acid anhydride and about 2 Gm. of anhydrous sodium acetate, and boil the mixture gently during one hour and a half. Allow it to cool, wash the acetylized oil with distilled water, and afterwards with sodium hydroxide T.S., until the mixture is slightly alkaline to phenolphthalein T.S., and then dry it with the aid of fused calcium chloride, and filter. Transfer to a tared 100 Cc. flask 3 Cc. of the dry acetylized oil, note the exact weight, add 50 Cc. of half-normal alcoholic potassium hydroxide V.S., connect with a reflux condenser, and boil gently during one hour. After cooling, titrate the residual alkali with half-normal sulphuric acid V.S., using phenolphthalein T.S. as indicator. Subtract the number of cubic centimeters of half-normal sulphuric acid V.S. required from the 50 Cc. of half-normal alcoholic potassium hydroxide V.S. taken, multiply the difference by 11.026, and divide by the weight of the dry acetylized oil taken, less the above difference multiplied by 0.021; the quotient will represent the percentage of santalol in the Oil of Santal.

NOTE.—The difference referred to above represents the number of cubic centimeters of half-normal alcoholic potassium hydroxide V.S. consumed by the acetylized oil.

Average dose.—0.5 Cc. (8 minims).

OLEUM SASSAFRAS

Oil of Sassafras

A volatile oil distilled from the root, especially the root bark, of *Sassafras variifolium* (Fam. *Lauraceæ*). It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A yellow or reddish-yellow liquid, having the characteristic odor of sassafras, and a warm, aromatic taste.

Specific gravity: 1.065 to 1.075 at 25° C. (77° F.).

The Oil is dextrogyrate, but should not deviate the ray of polarized light more than +4° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Average dose.— 0.2 Cc. (3 minims).

OLEUM SINAPIS VOLATILE

Volatile Oil of Mustard

A volatile oil obtained from Black Mustard (freed from its fatty oil) by maceration with water and subsequent distillation, yielding, when assayed by the process given below, not less than 92 percent. of allyl iso-thiocyanate. It should be carefully kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or pale yellow, limpid, and strongly refractive liquid, having a very pungent and acrid odor. *Great caution should be exercised when smelling this Oil;* it should not be tasted without being highly diluted.

Specific gravity: 1.013 to 1.020 at 25° C.° (77° F.).

Miscible with alcohol in all proportions, forming a clear solution.

If to 3 Gm. of the Oil 6 Gm. of sulphuric acid be gradually added, the liquid being kept cool, the mixture, upon subsequent agitation, will evolve sulphur dioxide, but it will remain of a light yellow color, and although at first clear, it will afterwards become thick and occasionally crystalline, and the pungent odor of the Oil will disappear.

If a portion of the Oil be heated in a flask connected with a well-cooled condenser, it should distil completely between 148° and 152° C. (298.4° and 305.6° F.), and both the first and the last portions of the distillate should have the same specific gravity as the original Oil (absence of *alcohol, chloroform, petroleum, fatty oils,* or more than traces of *carbon disulphide*).

If a small portion of the Oil be diluted with 5 times its volume of alcohol, and a drop of ferric chloride T.S. be added, no blue or violet color should be produced (absence of *phenols*).

Assay

Weigh accurately about 2 Gm. of Volatile Oil of Mustard, and dilute this with sufficient alcohol to make 50 Cc. of the solution represent 1 Gm. of the Oil; of this solution, 5 Cc. are transferred to a 100 Cc. measuring flask, and 30 Cc. of tenth-normal silver nitrate V.S. and 5 Cc. of ammonia water are added. The flask is well-stoppered and set aside in a dark place for twenty-four hours. It is then heated in a water-bath, at a temperature of 80° C. (176° F.), for half an hour, shaking the flask frequently. The contents of the flask are diluted with water to the 100 Cc. mark and filtered. To 50 Cc. of the filtrate, 4 Cc. of nitric acid and a few drops of ferric ammonium sulphate T.S. are added, and finally sufficient tenth-normal potassium sulphocyanate V.S. to produce a permanent red color; not more than 5.6 Cc. of the latter reagent should be required (each Cc. of tenth-normal silver nitrate V.S. consumed corresponding to 0.00492 gramme of allyl iso-thiocyanate).

Average dose.— 0.008 Cc. ($\frac{1}{8}$ minim).

OLEUM TEREBINTHINÆ

Oil of Turpentine

A volatile oil recently distilled from turpentine. It should be kept in well-stoppered bottles.

A thin, colorless liquid, having a characteristic odor and taste, both of which become stronger and less pleasant by age and exposure to the air.

Specific gravity: 0.860 to 0.870 at 25° C. (77° F.).

When Oil of Turpentine is distilled, the larger part should pass over between 155° and 162° C. (311° and 323.6° F.).

Soluble in 3 times its volume of alcohol.

If 5 Cc. of Oil of Turpentine be shaken with an equal volume of potassium hydroxide T.S., its color should not become darker than a light straw-yellow upon standing twenty-four hours.

If 1 Cc. of the Oil be evaporated in a small dish on a water-bath, it should leave not more than a very slight residue (absence of *petroleum, paraffin oils,* or *rosin*).

Three drops of Oil of Turpentine, placed on a sheet of clean white filter paper and exposed to the air, should evaporate entirely without leaving a permanent stain (absence of *kerosene* or *rosin oil*).

If 5 Cc. of Oil of Turpentine be placed in a small beaker, and 20 Cc. of sulphuric acid be gradually added, with agitation, while the beaker is cooled by immersion in cold water, and the contents, after cooling and renewed agitation, be transferred to a burette, graduated in tenths, the clear layer which forms after the dark mass has settled should not measure more than 0.35 Cc. (absence of *petroleum benzin, kerosene,* or *similar hydrocarbons*).

OLEUM TEREBINTHINÆ RECTIFICATUM

Rectified Oil of Turpentine

Oil of Turpentine, *a convenient quantity.*
Solution of Sodium Hydroxide, *a sufficient quantity.*

Shake the Oil of Turpentine thoroughly with an equal volume of Solution of Sodium Hydroxide, and introduce the mixture into a copper still connected with a well-cooled condenser. Recover about *three-fourths* of the Oil by distillation, separate the clear Oil from the water, and filter. Keep the product in well-stoppered, amber-colored bottles, in a cool place.

Rectified Oil of Turpentine should always be dispensed when oil of turpentine is required for internal use.

A thin, colorless liquid, which should conform to the properties and tests given under *Oleum Terebinthinæ.*

Specific gravity: 0.860 to 0.865 at 25° C. (77° F.).

If about 10 Cc. of the Oil be evaporated in a dish on a water-bath, no weighable residue should be left.

Average dose.—1 Cc. (15 minims).

OLEUM THEOBROMATIS

Oil of Theobroma

A fixed oil expressed from the roasted seeds of *Theobroma Cacao* Linné (Fam. *Sterculiaceæ*).

A yellowish-white solid, having a faint, agreeable odor, and a bland, chocolate-like taste.

Specific gravity: 0.970 to 0.976 at 25° C. (77° F.).

Oil of Theobroma should be brittle at temperatures below 15° C. (59° F.), and should melt at 30° to 35° C. (86° to 95° F.) to a clear liquid.

It is readily soluble in ether, chloroform, or benzene; also soluble in 100 parts of cold absolute alcohol, and in 20 parts of boiling absolute alcohol; the solutions should be neutral to test paper.

If 1 Gm. of Oil of Theobroma be dissolved in 3 Cc. of ether in a test-tube at a temperature of 17° C. (62.6° F.), and the tube frequently plunged into water at 0° C. (32° F.), the liquid should not become turbid nor deposit white flakes in less than three minutes; and if the mixture after congealing be again brought to 15° C. (59° F.), it should gradually form a perfectly clear liquid (absence of *wax*, *stearin*, *tallow*, etc.).

Oil of Theobroma, saponified by alcoholic potassium hydroxide T.S., should show a saponification value of 188 to 195 (see Appendix, Test No. 99).

If 0.8 Gm. of Oil of Theobroma be dissolved in 10 Cc. of chloroform in a 250 Cc. bottle or flask, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and alcoholic mercuric chloride T.S. added, and if, after standing for four hours, protected from light, 20 Cc. of potassium iodide T.S. be added and the mixture diluted with 50 Cc. of water, on titrating the excess of iodine with tenth-normal sodium thiosulphate V.S. an iodine value of not less than 33 nor more than 38 should be obtained (see Appendix, Test No. 51).

OLEUM THYMI

Oil of Thyme

A volatile oil distilled from the leaves and flowering tops of *Thymus vulgaris* Linné (Fam. *Labiatæ*), and containing, when assayed by the process given below, not less than 20 percent., by volume, of phenols. It should be kept in well-stoppered, amber-colored bottles, in a cool place, protected from light.

A colorless or reddish liquid, having a strong odor of thyme, and an aromatic, pungent, afterwards cooling taste.

Specific gravity: 0.900 to 0.930 at 25° C. (77° F.).

It is slightly lævogyrate; not more than —3° in a 100 Mm. tube, at a temperature of 25° C. (77° F.).

Oil of Thyme is soluble in half its volume of alcohol, also in 1 to 2 volumes of 80 percent. alcohol.

With a drop of ferric chloride T.S. it yields a greenish-brown color, which changes to reddish.

If 1 Cc. of Oil of Thyme be shaken with 10 Cc. of hot water, and, after cooling, the liquid be passed through a wet filter, the filtrate should not assume, with a drop of ferric chloride T.S., a bluish or violet color (absence of *official phenol*).

Assay

Introduce 40 Cc. of solution of sodium hydroxide (1 in 20) into a burette of 50 Cc. capacity (graduated in tenths). Add 10 Cc. of the Oil to be assayed, stopper the burette with a well-fitting cork, shake the mixture thoroughly, and set aside for twelve to twenty-four hours. Drops of Oil adhering to the side of the burette should be loosened by tapping and rotating the burette. After the alkaline solution has become clear, the volume of non-phenol oil remaining (which should measure not more than 8 Cc.) is noted and subtracted from the

10 Cc. of the Oil originally taken. The difference, multiplied by 10, indicates the percentage of phenols in the Oil.

Average dose.—0.2 Cc. (3 minims).

OLEUM TIGLII

Croton Oil

A fixed oil expressed from the seeds of *Croton Tiglium* Linné (Fam. *Euphorbiaceæ*). It should be kept in small, well-stoppered bottles, and should be handled with caution.

A pale yellow or brownish-yellow, somewhat viscid, and slightly fluorescent liquid, having a slight fatty odor, and a mild, oily, afterwards acrid and burning taste (*great caution is necessary in tasting*).

When applied to the skin, it produces rubefaction, or a pustular eruption.

Specific gravity: 0.935 to 0.950 at 25° C. (77° F.).

It reddens blue litmus paper moistened with alcohol.

When fresh it is soluble in from 55 to 60 parts of alcohol, the solubility increasing by age; freely soluble in ether, chloroform, carbon disulphide, and in fixed or volatile oils.

When gently heated with twice its volume of absolute alcohol, it forms a clear solution from which the Croton Oil should separate on cooling.

If to 2 Cc. of Croton Oil 1 Cc. of fuming nitric acid and 1 Cc. of water be added, and the mixture vigorously shaken, it should not solidify either completely or partially, after standing for one or two days (absence of *other non-drying oils*).

Croton Oil saponified by alcoholic potassium hydroxide T.S. should show a saponification value of from 203 to 215 (see Appendix, Test No. 99).

If 0.3 Gm. of Croton Oil be dissolved in 10 Cc. of chloroform in a 250 Cc. bottle or flask, and 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S. and alcoholic mercuric chloride T.S. added, and if, after standing for four hours, protected from light, 20 Cc. of potassium iodide T.S. be added and the mixture diluted with 50 Cc. of water, on titrating the excess of iodine with tenth-normal sodium thiosulphate V.S., an iodine value of not less than 103 nor more than 109 should be obtained (see Appendix, Test No. 51).

Average dose.—0.05 Cc. (1 minim).

OPII PULVIS

Powdered Opium

Opium dried at a temperature not exceeding 85° C. (185° F.) and reduced to a very fine powder.

Powdered Opium, for pharmaceutical and medicinal purposes, when assayed by the process given under *Opium*, should yield not less than 12 percent. nor more than 12.5 percent. of crystallized morphine.

Powdered Opium of a higher percentage may be brought within these limits by admixture with Powdered Opium of a lower percentage or powdered sugar of milk in proper proportions.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

OPIUM

Opium

The concrete, milky exudation obtained by incising the unripe capsules of *Papaver somniferum* Linné (Fam. *Papaveraceæ*), and yielding, in its normal, moist condition, not less than 9 percent. of crystallized morphine when assayed by the process given below.

In irregular, flattened, more or less rounded masses of variable size, externally grayish-brown, covered with remnants of poppy leaves and with occasional fruits of a species of *Rumex;* more or less plastic when fresh, but becoming hard on keeping; internally dark brown, somewhat lustrous; odor strong, narcotic; taste bitter and characteristic.

Assay of Opium

Opium, in any condition to be valued, *ten grammes*	10.0 Gm.
Ammonia Water, *three and one-half cubic centimeters*	3.5 Cc.
Alcohol,	
Ether,	
Distilled Water,	
Lime Water, each, *a sufficient quantity.*	

Introduce the Opium (which, if fresh, should be in very small pieces, and if dry, in very fine powder) into an Erlenmeyer flask having a capacity of about 300 Cc., add 100 Cc. of distilled water, stopper the flask, and agitate it every ten minutes (or continuously in a mechanical shaker) during three hours. Then pour the contents as evenly as possible upon a wetted filter having a diameter of 12 Cm., and, when the liquid has drained off, wash the residue with distilled water, carefully dropped upon the edges of the filter and its contents, until 150 Cc. of filtrate have been obtained. Then carefully transfer the moist Opium back to the flask by means of a spatula, add 50 Cc. of distilled water, agitate it thoroughly and repeatedly during fifteen minutes, and return the whole to the filter. When the liquid has drained off, wash the residue, as before, until the second filtrate measures 150 Cc., and finally collect about 20 Cc. more of a third filtrate. Evaporate carefully in a tared dish, first, the second filtrate to a small volume, then add the first filtrate, rinsing the vessels with the third filtrate, and continue the evaporation until the residue weighs 14 Gm. Rotate the concentrated solution about in the dish until the rings of extract are redissolved, pour the liquid into a tared Erlenmeyer flask having a capacity of about 100 Cc., and rinse the dish with a few drops of water at a time until the entire solution, after the rinsings have been added to the flask, weighs 20 Gm. Then add 10 Gm. (or 12.2 Cc.) of alcohol, shake the flask well, add 25 Cc. of ether, and repeat the shaking. Now add the ammonia water from a graduated pipette or burette, stopper the flask with a sound cork, shake it thoroughly during ten minutes, and then set it aside, in a moderately cool place, for at least sixteen hours.

Remove the stopper carefully, and should any crystals adhere to it, brush them into the flask. Place in a small funnel two rapidly acting filters, of a diameter of 7 Cm., plainly folded, one within the other (the triple fold of the inner filter being laid against the single side of the outer filter), wet them well with ether, and decant the ethereal solution as completely as possible upon the inner filter. Add 10 Cc. of ether to the contents of the flask, rotate it, and again decant the ethereal layer upon the inner filter. Repeat this operation with another portion of 10 Cc. of ether. Then pour the liquid in the flask into the filter, in portions, in such a way as to transfer the greater portion of the crystals to the filter, and, when the liquid has passed through, transfer the remaining crystals to the filter by washing the flask with several portions of water, using not more than 15 Cc. in all. Use a feather or rubber-tipped glass rod to remove the crystals that adhere to the flask. Allow the double filter to drain, then apply water to the crystals, drop by drop, until they are practically free from mother-liquor, and afterwards wash them, drop by drop, from a pipette, with alcohol previously saturated with powdered morphine. When this has passed through, displace the remaining alcohol by ether, using about 10 Cc. or more, if necessary. Allow the filter to dry in a moderately warm place, at a temperature not exceeding 60° C. (140° F.) until its weight remains constant, then carefully transfer the crystals to a tared watch-glass and weigh them.

Place the crystals (which are not quite pure) in an Erlenmeyer flask, add lime water (10 Cc. for each 0.1 Gm. of morphine) and shake the flask at intervals during half an hour. Pass the liquid through two counterpoised rapidly acting, plainly folded filters, one within the other (the triple fold of the inner filter being laid against the single fold of the outer filter), rinse the flask with more lime water and pass the washings through the filter until the filtrate, after acidulating, no longer yields a precipitate with mercuric potassium iodide T.S. Press the filters until nearly dry between bibulous paper and dry them to a constant weight, then weigh the contents, using the outer filter as a counterpoise. Deduct the weight of the insoluble matter on the filter from the weight of the impure morphine previously found. The difference, multiplied by 10, represents the percentage of crystallized morphine contained in the Opium.

Average dose.— 0.100 Gm. = 100 milligrammes (1½ grains).

OPIUM DEODORATUM

Deodorized Opium

Powdered Opium, *five hundred grammes* . . . . 500 Gm.
Purified Petroleum Benzin, *a sufficient quantity.*

Macerate the Powdered Opium for twenty-four hours in a wide-mouthed, well-closed bottle, with sufficient Purified Petroleum Benzin to completely cover it, shaking occasionally. Decant the liquid as closely as possible and repeat the treatment with Purified Petroleum Benzin. Again decant the liquid and pour the contents of the bottle into a plain filter contained in a glass funnel which should be well covered, drain, and then slowly percolate the residue with Purified Petroleum Benzin until the latter passes without color. Remove the filter containing the Opium from the funnel and expose the powder to the open air, so that it may dry thoroughly.

Deodorized Opium should be kept in well-stoppered bottles, and, when assayed by the process given under *Opium*, should be found to yield not less than 12 percent. nor more than 12.5 percent. of crystallized morphine.

Opium in coarser powder may be deodorized in the same manner as directed above.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

OPIUM GRANULATUM

Granulated Opium

Opium dried at a temperature not exceeding 85° C. (185° F.) and reduced to a coarse (No. 20) powder.

Granulated Opium, when assayed by the process given under *Opium*, should yield not less than 12 percent. nor more than 12.5 percent. of crystallized morphine. Granulated Opium of a higher percentage may be brought within these limits by admixture with Granulated Opium of a lower percentage, powdered sugar of milk or acacia in proper proportions.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

PANCREATINUM

Pancreatin

A mixture of the enzymes naturally existing in the pancreas of warm-blooded animals, usually obtained from the fresh pancreas of the hog (*Sus scrofa*, var. *domesticus* Gray), or the ox (*Bos taurus* Linné), and consisting principally of amylopsin, myopsin, trypsin, and steapsin, and proved to be capable, when assayed by the process given below, of converting not less than 25 times its own weight of starch into substances soluble in water.

A cream-colored, amorphous powder, having a faint, peculiar, not unpleasant odor, and a somewhat meat-like taste.

Slowly soluble in water, and containing not more than 10 percent. of substances insoluble in this solvent; insoluble in alcohol.

Pancreatin digests albuminoids and converts starch into sugar, dextrin, or maltose; it exhibits its peculiar activities in neutral, faintly alkaline, and faintly acid media; more than traces of mineral acids or large amounts of alkalies render it inert. Alkali carbonates exert slightly inhibitory power upon Pancreatin. The digestive power of Pancreatin is injured by contact with pepsin in solution.

If 0.28 Gm. of Pancreatin and 1.5 Gm. of sodium bicarbonate be added to 100 Cc. of tepid water contained in a flask, and if 400 Cc. of fresh cows' milk, which has been previously heated to 38° C. (100.4° F.), be then added, and the temperature of the mixture maintained at this point for thirty minutes, the milk should be so completely peptonized that, if a small portion of it be diluted with three times its volume of water, transferred to a test-tube and mixed with some nitric acid, no coagulation should occur.

Assay of Pancreatin

Pancreatin, *three-tenths of a gramme*	**0.3 Gm.**
Starch, dry and in fine powder, *seven and one-half grammes* . .	**7.5 Gm.**
Distilled Water,	
Tenth-normal Iodine V.S., each, *a sufficient quantity.*	

Introduce the starch into a flask, add 200 Cc. of distilled water, and boil until a translucent mixture results. Cool the resulting paste to 40.5° C. (105° F.), and add to it the Pancreatin, previously dissolved in about 10 Cc. of distilled water at 40.5° C. (105° F.). Shake the flask well, maintaining the temperature of the mixture at 40.5° C. (105° F.) during five minutes; at the end of this time all of the starch should be converted into substances soluble in water, and a thin liquid be produced. Mix 2 drops of tenth-normal iodine V.S. with 60 Cc. of distilled water, and add to it 4 drops of the warm converted starch solution; no color should result, or, at most, a wine-red color, showing the presence of dextrin and maltose. The appearance of a blue or purple color indicates the presence of *unconverted starch* and that the Pancreatin is below the standard,—*i.e.*, that of converting not less than 25 times its own weight of starch into substances soluble in water.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

PARAFFINUM

Paraffin

A mixture of solid hydrocarbons, chiefly of the methane series; usually obtained by chilling and pressing the distillates from petroleum having high boiling points, and purifying the solid press cake so obtained.

A colorless, more or less translucent mass, crystalline when separating from solution; without odor or taste, and slightly greasy to the touch.

Specific gravity: from 0.890 to 0.905 at 25° C. (77° F.).

Insoluble in water or alcohol; slightly soluble in absolute alcohol; readily soluble in ether, petroleum benzin, benzene, carbon disulphide, volatile oils, and in warm fixed oils.

Its alcoholic solution should not redden moistened blue litmus paper.

When heated, it melts at from 51.6° to 57.2° C. (125° to 135° F.), and on stronger heating ignites, burning with a luminous flame and depositing carbon, but leaving no permanent residue.

If 0.5 Gm. of Paraffin be heated in a dry test-tube with an equal weight of sulphur, the mixture will become black from the separated carbon, with the evolution of hydrogen sulphide gas.

Paraffin is not acted upon or colored by concentrated sulphuric acid or nitric acid in the cold.

If 0.5 Gm. of Paraffin be heated and 0.1 Gm. of powdered fuchsin added to the fused mass, the latter should not assume a pink or red color (absence of *stearic acid*).

PARALDEHYDUM

Paraldehyde

$C_6H_{12}O_3 = 131.10$

A polymer of acetaldehyde [$CH_3.COH = 43.70$]. Paraldehyde should be kept in well-stoppered, dark amber-colored bottles, in a cool place.

A colorless, transparent liquid, having a strong, characteristic, but not unpleasant or pungent odor, and a burning and cooling taste.

Specific gravity: 0.990 at 25° C. (77° F.).

Soluble in 8 parts of water at 25° C. (77° F.), and in 16.5 parts of boiling water; the cold aqueous solution becomes turbid on being boiled. Paraldehyde is miscible, in all proportions, with alcohol, ether, and fixed or volatile oils.

When cooled to near 0° C. (32° F.), Paraldehyde solidifies to a crystalline mass, which becomes liquid again at 10.5° C. (51° F.). It boils at 121° to 125° C. (249.8° to 257° F.), evolving inflammable vapors.

Paraldehyde is neutral, or slightly acid to litmus paper.

When distilled with a small portion of sulphuric acid, Paraldehyde is converted into acetaldehyde, boiling at about 21° C. (69.8° F.). On warming in a test-tube some silver ammonium nitrate T.S. saturated with Paraldehyde, a silver mirror will form on standing.

On heating some Paraldehyde on a water-bath, it should completely volatilize, without leaving any disagreeable odor (absence of *impurities* derived from *fusel oil*).

One Cc. of Paraldehyde should form, with 10 Cc. of water, a clear solution, free from oily drops (absence of *amyl alcohol*, etc.), and portions of this solution, when acidulated with nitric acid, should not be affected by silver nitrate T.S. (absence of *hydrochloric acid*), or barium chloride T.S. (absence of *sulphuric acid*).

A mixture of 8 Cc. of Paraldehyde and 8 Cc. of alcohol with 1 drop of phenolphthalein T.S. should acquire a pink color upon the addition of 0.5 Cc. of normal potassium hydroxide V.S. (limit of *free acid*).

Average dose.—2 Cc. (30 minims).

PAREIRA

Pareira

The dried root of *Chondrodendron tomentosum* Ruiz and Pavon (Fam. *Menispermaceæ*).

Subcylindrical, knotty, and somewhat tortuous, cut into pieces of various lengths, 1 to 6 Cm. in diameter; externally blackish-brown, with transverse ridges and fissures and longitudinal furrows; hard, heavy, and tough; when freshly cut having a waxy lustre, internally yellowish- or brownish-gray, the dried transverse sections exhibiting several inequilaterally concentric circles of interrupted, porous wood-wedges projecting beyond the markedly retracted intervening tissue of the rather large medullary rays; odor slight; taste bitter.

Average dose.—2 Gm. (30 grains).

PELLETIERINÆ TANNAS

Pelletierine Tannate

A mixture in varying proportions of the tannates of four alkaloids (punicine, iso-punicine, methyl-punicine, and pseudo-punicine), obtained from *Punica Granatum* Linné (Fam. *Punicaceæ*). It should be kept in small, well-stoppered, dark amber-colored vials.

A light yellow, odorless, amorphous powder, having an astringent taste, and a weak acid reaction.

Soluble in 235 parts of water, 12.6 parts of alcohol, and in 300 parts of ether at 25° C. (77° F.); insoluble in chloroform; soluble in warm diluted acids.

Pelletierine Tannate, when dried over sulphuric acid and heated, turns brown at 150° C. (302° F.), softens at about 165° C. (329° F.), and when heated to a higher temperature, decomposes and chars without melting. It leaves no residue on ignition.

Ferric chloride T.S. colors aqueous solutions of the salt blue-black.

In aqueous solutions of Pelletierine Tannate, soluble lead, mercury, and zinc salts produce white precipitates.

Platinic chloride T.S. produces no precipitate.

Ammonia water produces a white precipitate, soluble in excess of the precipitant, forming a yellowish-red solution.

Aqueous solutions of Pelletierine Tannate immediately reduce silver nitrate T.S., or gold chloride T.S., to metallic silver or gold, respectively, the former as a black precipitate, and the latter as a thin, purplish mirror on the test-tube.

Sulphuric acid gives a yellow color; the liquid, on being heated, turns slowly to green, and finally to purple. Nitric acid produces no color.

Sulphuric acid containing a trace of selenous acid produces a light bluish-green color, gradually becoming dark green, and developing a pink border.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

PEPO

Pepo

The ripe seed of *Cucurbita Pepo* Linné (Fam. *Cucurbitaceæ*).

Broadly ovate, flat, somewhat biconvex, about 20 Mm. long and 2 Mm. thick; externally whitish or yellowish-white, nearly smooth, with a shallow groove parallel to, and within 1 Mm. of, the margin; seed-coat consisting of a white coriaceous outer layer, and a membranaceous inner layer; embryo whitish, straight, with a conical hypocotyl and two plano-convex cotyledons; slightly odorous when contused; taste bland and oily.

Average dose.— 30 Gm. (1 ounce).

PEPSINUM

Pepsin

A proteolytic ferment or enzyme, obtained from the glandular layer of the fresh stomach of the hog (*Sus scrofa*, var. *domesticus* Gray), and proved to be capable, when assayed by the process given below, of digesting not less than 3000 times its own weight of freshly coagulated and disintegrated egg albumin.

If it is desired to use a diluent for reducing Pepsin of a higher digestive power to that required by the Pharmacopœia, sugar of milk should be employed for this purpose.

Lustrous white, pale yellow or yellowish, transparent or translucent scales or grains, or a fine white or cream-colored amorphous powder, free from any offensive odor, and having a slightly acid or saline taste. It should be not more than slightly hygroscopic.

Soluble, or almost entirely soluble, in about 50 parts of water, the solution having more or less opalescence; more soluble in water acidulated with hydrochloric acid; insoluble in alcohol, ether, or chloroform.

Pepsin, when in solution, is incompatible with alkalies, alkaline earths, or alkali carbonates. The presence of hydrochloric acid of greater strength than 0.5 percent. inhibits and rapidly destroys its proteolytic activity. Its solution is precipitated by the salts of many heavy metals, and by tannic acid or gallic acid. Pepsin and pancreatin in solution are incompatible with one another; if the solution be neutral or alkaline, the pancreatin gradually destroys the Pepsin, and if acid the Pepsin destroys the pancreatin.

On heating a solution of Pepsin in acidulated water to 100° C. (212° F.) it becomes milky, or yields a light flocculent precipitate, and loses all proteolytic power; in a dry state it is not injured if subjected to the above temperature. The activity of Pepsin in solution is destroyed by temperatures exceeding 70° C. (158° F.). Pepsin usually has a slightly acid reaction; it may be neutral, but should never be alkaline.

Assay of Pepsin

Pepsin, *one-tenth gramme*	0.1 Gm.
Egg Albumin, boiled and disintegrated, *ten grammes* . . .	10.0 Gm.
Diluted Hydrochloric Acid,	
Distilled Water, each, *a sufficient quantity*.	

Mix 9 Cc. of diluted hydrochloric acid with 291 Cc. of distilled water, and dissolve the Pepsin in 150 Cc. of the acid liquid. Immerse a hen's egg, which should be fresh, during fifteen minutes in boiling water; remove the pellicle and all of the yolk; rub the white, coagulated albumin through a clean No. 40 sieve. Reject the first portion that passes through the sieve, and place 10 Gm. of the succeeding portion in a wide-mouthed bottle of 100 Cc. capacity. Add 20 Cc. of the acid liquid, and with the aid of a glass rod tipped with cork or black rubber tubing, completely disintegrate the albumin; then rinse the rod with 15 Cc. more of the acid liquid and add 5 Cc. of the solution of Pepsin. Cork the bottle securely, invert it three times, and place it in a water-bath that has previously been regulated to maintain a temperature of 52° C. (125.6° F.). Keep it at this temperature for two and one-half hours, agitating every ten minutes by inverting the bottle once. Then remove it from the water-bath, add 50 Cc. of cold distilled water, transfer the mixture to a narrow graduated cylinder, and allow it to stand for half an hour. The deposit of undissolved albumin should not then measure more than 1 Cc.

The relative proteolytic power of Pepsin stronger or weaker than that just described may be determined by ascertaining through repeated trials the quantity of the above Pepsin solution required to digest, under the prescribed conditions, 10 Gm. of boiled and disintegrated egg albumin. Divide 15,000 by this quantity expressed in Cc. to ascertain how many parts of egg albumin one part of the Pepsin will digest.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

PETROLATUM

Petrolatum

[PETROLATUM MOLLE, PETROLATUM SPISSUM, PHARM. 1890]

A mixture of hydrocarbons, chiefly of the methane series, obtained by distilling off the lighter and more volatile portions from petroleum, and purifying the residue.

An unctuous mass, of about the consistence of an ointment, varying in color from yellowish to light amber, having not more than a slight fluorescence, even after being melted, transparent in thin layers, completely amorphous; without odor or taste, but giving off, when heated, a faint petroleum-like odor.

If a portion of Petrolatum be liquefied and brought to a temperature of 60° C. (140° F.), it should have a specific gravity of from 0.820 to 0.850.

Petrolatum is insoluble in water; scarcely soluble in cold or hot alcohol, or in cold, absolute alcohol, but soluble in boiling absolute alcohol, and readily soluble in ether, chloroform, carbon disulphide, oil of turpentine, petroleum benzin, benzene, and fixed or volatile oils.

The melting point of Petrolatum ranges between 45° and 48° C. (113° and 118.4° F.). If heated on platinum foil to a still higher temperature, Petrolatum should be completely volatilized without emitting any acrid odor.

If melted Petrolatum be well shaken with water the latter should not redden blue litmus paper.

If 10 Gm. of Petrolatum be digested at 100° C. (212° F.) for half an hour with 10 Gm. of sodium hydroxide and 50 Cc. of water, the aqueous layer separated and supersaturated with sulphuric acid, no oily or solid substance should separate (absence of *fixed oils* or *fats* of *animal* or *vegetable origin* and of *rosin*).

PETROLATUM ALBUM

White Petrolatum

A colorless mixture of hydrocarbons, chiefly of the methane series, obtained by distilling off the lighter and more volatile portions from petroleum, and purifying the residue.

A white unctuous mass, of about the consistence of an ointment, transparent in thin layers, completely amorphous; without odor or taste. In other respects White Petrolatum has the characteristics of, and should respond to the tests given under, *Petrolatum*.

PETROLATUM LIQUIDUM

Liquid Petrolatum

A mixture of hydrocarbons, chiefly of the methane series, obtained by distilling off most of the lighter and more volatile portions from petroleum, and purifying the liquid residue.

A colorless, or very slightly yellowish, oily, transparent liquid, without odor or taste, but giving off, when heated, a faint odor of petroleum.

Specific gravity: about 0.870 to 0.940 at 25° C. (77° F.).

It is insoluble in water; scarcely soluble in cold or hot alcohol, or in cold absolute alcohol, but soluble in boiling absolute alcohol, and readily soluble in ether, chloroform, carbon disulphide, oil of turpentine, petroleum benzin, benzene, and fixed or volatile oils.

When heated on platinum foil, Liquid Petrolatum is completely volatilized without emitting acrid vapors.

If a test-tube be half filled with Liquid Petrolatum and a piece of moistened blue litmus paper be introduced, upon shaking the liquid vigorously the paper should not be reddened (absence of *acid impurities*).

In other respects Liquid Petrolatum has the characteristics of, and should respond to the tests given under, *Petrolatum*.

PHENOL

Phenol

$C_6H_5OH = 93.34$

[ACIDUM CARBOLICUM, PHARM. 1890]

Hydroxybenzene, obtained either from coal-tar by fractional distillation and subsequent purification, or made synthetically. It should contain, when assayed by the process given below, not less than 96 percent. of absolute Phenol. It should be kept in dark amber-colored, well-stoppered bottles.

Colorless, interlaced, or separate needle-shaped crystals, or a white, crystalline mass, sometimes acquiring a reddish tint; having a characteristic, somewhat aromatic odor; when copiously diluted with water, it has a sweetish taste, with a slightly burning after-taste, and, when undiluted, cauterizes and whitens the skin and mucous membrane.

Soluble in 19.6 parts of water at 25° C. (77° F.), the solubility varying according to the degree of hydration of the Phenol; very soluble in alcohol, ether, chloroform, benzene, carbon disulphide, glycerin, fixed and volatile oils; almost insoluble in petroleum benzin.

When gently heated, Phenol melts, forming a highly refractive liquid. It is also liquefied by the addition of about 8 percent. of water. If the Phenol be liquefied by a gentle heat, and then slowly cooled under constant stirring, until it is partly recrystallized, the semi-liquid mass should have a temperature (remaining stationary for a short time) not lower than 39° C. (102.2° F.).

Phenol should have a boiling point from 178° to 182° C. (352.4° to 359.6° F.).

When heated upon a water-bath, it should be volatilized without leaving a residue. The vapor is inflammable.

Phenol is faintly acid to blue litmus paper.

Its aqueous solution yields, with bromine water, a white precipitate of tribromphenol, which at first redissolves, but becomes permanent as more of the reagent is added, and appears crystalline when viewed under the microscope.

On adding to 10 Cc. of an aqueous solution of Phenol (1 in 100) 1 drop of ferric chloride T.S., the liquid acquires a violet-blue color.

One volume of cold, liquefied Phenol (rendered liquid by the addition of 8 percent. of water) forms, with 1 volume of glycerin, a clear liquid which is not rendered turbid by the addition of 3 volumes of water (absence of *creosote* and of *cresol*).

Assay of Phenol

Dissolve 1.556 Gm. of the Phenol to be valued in a sufficient quantity of water to make 1000 Cc. Transfer 25 Cc. of this solution (containing 0.0389 Gm. of Phenol) to a glass-stoppered bottle having a capacity of about 200 Cc., add 30 Cc. of tenth-normal bromine V.S., then 5 Cc. of hydrochloric acid, and immediately insert the stopper. Shake the bottle repeatedly during half an hour, then remove the stopper just sufficiently to introduce quickly 5 Cc. of an aqueous solution of potassium iodide (1 in 5), being careful that no bromine vapor escapes, and immediately stopper the bottle. Shake the latter thoroughly, remove the stopper and rinse it and the neck of the bottle with a little water, so that the washings may flow into the bottle, and then add 1 Cc. of chloroform and shake well. Add, from a burette, tenth-normal sodium thiosulphate V.S., until the iodine tint is exactly discharged, and does not reappear after thorough agitation. Note the number of Cc. of tenth-normal sodium thiosulphate V.S. consumed (which should not exceed 6 Cc.). The percentage of absolute Phenol is found by subtracting the number of Cc. of tenth-normal sodium thiosulphate V.S. used, from 30 (the number of Cc. of bromine V.S. originally added), and multiplying the remainder by 4.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

PHENOL LIQUEFACTUM

Liquefied Phenol

A liquid composed of not less than 86.4 percent., by weight, of absolute Phenol [$C_6H_5OH = 93.34$], and about 13.6 percent., by weight, of water.

Phenol, *a convenient quantity.*
Distilled Water, *a sufficient quantity.*

Liquefy the Phenol by placing the unstoppered container in a water-bath, and apply heat gradually until the crystals have melted; transfer the liquid to a tared vessel and weigh; then add for each *nine grammes* of Phenol *one gramme* of Distilled Water and mix thoroughly. It should be kept in dark amber-colored, well-stoppered bottles.

A colorless liquid, which may develop a slight reddish tint upon keeping, having a characteristic, somewhat aromatic odor, and when copiously diluted with water, a sweetish taste with a slightly burning after-taste, and, when undiluted, cauterizing and whitening the skin and mucous membrane.

Specific gravity: about 1.065 at 25° C. (77° F.).

Soluble in 12 parts of water at 25° C. (77° F.). Miscible with alcohol, ether, and glycerin in all proportions.

One part of Liquefied Phenol acquires a permanent cloudiness when mixed respectively with 2 parts of chloroform, 1.5 parts of benzene, 2.5 parts of carbon disulphide, 2 parts of oil of turpentine, or 2.5 parts of olive oil.

Liquefied Phenol begins to crystallize when the temperature of the liquid is lowered to about 13.5° C. (56.3° F.).

When heated, Liquefied Phenol begins to boil at about 115° C. (239° F.), and upon continuing the heat the boiling point rises; it should not exceed 188° C. (370.4° F.). When thus deprived of water, it should respond to the tests given under *Phenol.*

Average dose.— 0.05 Cc. (1 minim).

PHENYLIS SALICYLAS

Phenyl Salicylate

$C_{13}H_{10}O_3 = 212.47$

[SALOL, PHARM. 1890]

The salicylic ester [$C_6H_4(OH)COOC_6H_5$ 1:2] of phenyl.

A white, crystalline powder, having a faint, aromatic odor, and a slight, but characteristic taste.

Soluble in 2333 parts of water, and in 5 parts of alcohol at 25° C. (77° F.); very soluble in hot alcohol, and in ether, chloroform, and fixed and volatile oils.

When heated to 42° C. (107.6° F.) it melts, and at a higher temperature is consumed, leaving no weighable residue.

If to the alcoholic solution be added diluted ferric chloride T.S., a violet color is produced.

If 0.2 to 0.3 Gm. of Phenyl Salicylate be dissolved in a little warm sodium hydroxide T.S., and the solution be then acidified with hydrochloric acid, salicylic acid separates, and the odor of phenol is recognizable.

Phenyl Salicylate should not redden moistened blue litmus paper (absence of *free acids*).

If 1 Gm. of Phenyl Salicylate be shaken with 50 Cc. of water, the liquid filtered, and 5 drops of ferric chloride T.S., previously diluted with 20 volumes of water, be added, the filtrate should show either no color, or at most a trace (limit of *uncombined phenol* or *salicylic acid*).

If portions of the same filtrate be tested separately with barium nitrate T.S. and silver nitrate T.S., they should show no turbidity (absence of *sulphates* and *chlorides*).

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

PHOSPHORUS

Phosphorus

P = 30.77

It should contain not less than 99.5 percent. of pure Phosphorus, and be carefully kept under water, in strong, well-closed vessels, in a secure and moderately cool place, protected from light.

A translucent, nearly colorless solid, of a waxy lustre, having, at ordinary temperatures, about the consistence of beeswax. By long keeping, the surface becomes white or red, and occasionally black. It has a distinctive and disagreeable odor and taste (*but should not be tasted, except in very dilute solution*). When exposed to the air, it emits white fumes, which are luminous in the dark, and have an odor somewhat resembling that of garlic; on longer exposure to air, it often takes fire spontaneously.

Specific gravity: 1.830 at 10° C. (50° F.), and 1.820 at 25° C. (77° F.).

Melting point: 44° C. (111.2° F.).

Phosphorus is insoluble, or nearly so, in water, to which, however, it imparts its characteristic, disagreeable odor and taste; soluble in 350 parts of absolute alcohol at 15° C. (59° F.), in 240 parts of boiling absolute alcohol, in 80 parts of absolute ether, in about 50 parts of any fatty oil, and in about 25 parts of chloroform; it is very soluble in carbon disulphide, the latter yielding a solution which must be handled with the greatest care to prevent evaporation, which would be followed by instant ignition.

To test for *arsenic* and *sulphur* proceed as follows: Add 1 Gm. of Phosphorus to 10 Cc. of nitric acid diluted with 10 Cc. of distilled water, in a flask having a capacity of 50 Cc., and digest the mixture at a gentle heat on a water-bath while passing a current of carbonic acid gas into the flask over the surface of the liquid until the Phosphorus is dissolved. Transfer the solution to a dish, and evaporate it until no more nitrous vapors are given off, and then dilute the solution to 100 Cc. with distilled water. One Cc. of this solution should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

On adding barium chloride T.S. to the remainder of the liquid, not more than a slight opalescence should be produced (limit of *sulphur*).

Average dose.— 0.0005 Gm. = 0.5 milligramme ($\frac{1}{128}$ grain).

PHYSOSTIGMA

Physostigma

The ripe seed of *Physostigma venenosum* Balfour (Fam. *Leguminosæ*), yielding, when assayed by the process given below, not less than 0.15 percent. of alkaloids soluble in ether.

Oblong, somewhat reniform, 15 to 30 Mm. long, 10 to 15 Mm. thick; externally reddish- or chocolate-brown, smooth, somewhat roughened near the brownish-black groove which extends almost the entire length of the convex edge, its reddish, rounded margins elevated and somewhat thickened; embryo whitish, with a short, curved hypocotyl and two large, concavo-convex cotyledons; having a bean-like and heavy odor when crushed; taste at first starchy, afterwards acrid.

Assay of Physostigma

Physostigma, in No. 60 powder, *twenty grammes* . . . . . . 20 Gm.
Ether,
Solution of Sodium Bicarbonate (1 in 20),
Normal Sulphuric Acid V.S.,
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Distilled Water,
Iodeosin T.S., each, *a sufficient quantity.*

Introduce the Physostigma into an Erlenmeyer flask of about 250 Cc. capacity, add 200 Cc. of ether, and shake the flask well during ten minutes. Then add 10 Cc. of an aqueous solution of sodium bicarbonate (1 in 20), and shake the mixture vigorously at intervals during four hours. Allow the powder to settle, and decant 100 Cc. of the ether-solution (representing 10 Gm. of Physostigma) into a measuring cylinder; then transfer it to a separator, introduce a small piece of blue litmus paper, and add sufficient normal sulphuric acid V.S. to render the liquid acid, and then 10 Cc. of distilled water. Shake the liquid well for several minutes, and draw off the aqueous layer into another separator. Repeat the extraction, using 2 Cc. of normal sulphuric acid V.S. and 8 Cc. of distilled water, add the acid aqueous layer to the second separator, and finally again shake out the ether solution, using 1 Cc. of normal sulphuric acid V.S. and 9 Cc. of distilled water, adding this also to the second separator. To the combined acid liquids in the second separator, add 25 Cc. of ether, a small piece of red litmus paper, and sufficient sodium bicarbonate solution (1 in 20) to render it alkaline. Shake the separator for one minute, allow the liquids to separate, and draw off the ether into a beaker. Repeat the shaking out process with 20 Cc. and again with 15 Cc. of ether added to the separator, shake each time for one minute, allow the liquids to separate, and draw off the ether into the beaker. Carefully evaporate the ether from the combined solutions by means of a water-bath, and when dry, dissolve the residue in 5 Cc. of tenth-normal sulphuric acid V.S. and 20 Cc. of ether, which must be strictly neutral, and transfer this solution to a bottle, rinsing with 80 Cc. of water; add 5 drops of iodeosin T.S., and titrate the excess of acid with fiftieth-normal potassium hydroxide V.S., until, after shaking, the aqueous liquid just acquires a pink color. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from 5 (the 5 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.0273, and this product by 10; the result will be the percentage of alkaloids soluble in ether contained in the Physostigma. The figure 0.0273 represents the weight in grammes of alkaloids (mainly physostigmine) required to neutralize 1 Cc. of tenth-normal sulphuric acid V.S.

Average dose.—**0.100 Gm. = 100 milligrammes (1½ grains).**

PHYSOSTIGMINÆ SALICYLAS

Physostigmine Salicylate

$C_{15}H_{21}N_3O_2 . C_7H_6O_3 = 410.21$

The salicylate [$C_6H_4(OH)COOH . C_{15}H_{21}N_3O_2$] of an alkaloid obtained from Physostigma. It should be kept in small, dark amber-colored, well-stoppered vials.

Colorless, or faintly yellowish, shining, acicular, or short columnar crystals; odorless, and having a slightly bitter taste. *It should be tasted with great caution.* It acquires a reddish tint when long exposed to light and air.

Soluble in 72.5 parts of water, 12.7 parts of alcohol, 175 parts of ether, and in 8.6 parts of chloroform at 25° C. (77° F.); soluble in 15 parts of water at 80° C. (176° F.), and in 4 parts of alcohol at 60° C. (140° F.).

When heated, Physostigmine Salicylate begins to soften and turn slightly yellow at 160° C. (320° F.), and melts at 178.9° C. (354° F.). It leaves no residue on incineration.

Its aqueous solution shows an acid reaction to litmus paper, and upon standing twenty-four hours the solution acquires a pink color.

Ferric chloride T.S., produces in an aqueous solution of Physostigmine Salicylate a deep violet color; a solution of chlorinated lime added to the aqueous solution produces a red color.

On evaporating an aqueous solution of the salt to dryness with a few drops of ammonia water, a blue residue is produced, which is soluble in alcohol, and when so dissolved, yields a red fluorescent solution upon the addition of acetic acid in excess.

An aqueous solution of the salt is colored cherry-red by the addition of potassium hydroxide T.S., changing to a darker red, and finally to green.

Platinic chloride T.S. produces no precipitate in solutions of the salt (distinction from *physostigmine sulphate*).

Sulphuric acid containing in each Cc. 1 drop of solution of formaldehyde gives with Physostigmine Salicylate a bright pink color; sulphuric acid with a few particles of cane sugar produces a yellow color, turning to brown, then to purple, and finally to greenish-black.

If 0.005 Gm. of the salt be dissolved in nitric acid, a yellow solution results, which, on being heated, changes to an orange-color, then to blood-red, and on evaporation to dryness yields a green residue. When exposed to the fumes of nitric acid this residue becomes violet-blue, and when a drop of nitric acid is added to it, it forms a reddish-violet solution, which soon changes to blood-red, and finally, on standing, or on dilution, becomes greenish-yellow.

Average dose.— 0.001 Gm. = 1 milligramme ($\frac{1}{64}$ grain).

PHYSOSTIGMINÆ SULPHAS

Physostigmine Sulphate

$(C_{15}H_{21}N_3O_2)_2 . H_2SO_4 = 643.75$

The sulphate [$SO_2(OH)_2 . (C_{15}H_{21}N_3O_2)_2$] of an alkaloid obtained from Physostigma. It should be kept in well-stoppered, dark amber-colored vials.

A white, or yellowish-white, micro-crystalline powder, odorless, and having a bitter taste. *It should be tasted with great caution.* It is very deliquescent, and gradually turns reddish by exposure to air and light.

Very soluble in water, alcohol, and chloroform; soluble in 1200 parts of ether at 25° C. (77° F.).

When heated to 130° C. (266° F.), the salt becomes soft, and melts at about 140° C. (284° F.). Upon ignition, it is slowly consumed, leaving no residue.

Its aqueous solution shows an acid reaction to blue litmus paper.

Barium chloride T.S. produces in an aqueous solution of the salt a white precipitate, which is insoluble in hydrochloric acid.

An aqueous solution of Physostigmine Sulphate yields, with alkalies, a white precipitate, which quickly turns pink, and dissolves in an excess of the alkali, forming a pink or red solution, which soon fades to yellowish-green.

Gold chloride T.S. gives with aqueous solutions of the salt a purple color.

Platinic chloride T.S. produces in aqueous solutions of the salt a yellowish-white precipitate (distinction from *physostigmine salicylate*).

Sulphuric acid with Physostigmine Sulphate yields only a faint yellow color.

Sulphuric acid containing a crystal of potassium iodate, on being added to a crystal of the salt, gives a light purple color, immediately changing to yellowish-red.

If 0.005 Gm. of the salt be dissolved in nitric acid, a yellow solution results, which, on being heated, changes to an orange-color, then to blood-red, and, on evaporation to dryness, yields a green residue. When exposed to the fumes of nitric acid, this residue becomes violet-blue, and when a drop of nitric acid is added to it, it forms a reddish-violet solution, which soon changes to blood-red, and finally, on standing, or on dilution, becomes greenish-yellow.

Average dose.—0.001 Gm. = 1 milligramme ($\frac{1}{64}$ grain).

PHYTOLACCA

Phytolacca

[PHYTOLACCÆ RADIX, PHARM. 1890]

The dried root of *Phytolacca decandra* Linné (Fam. *Phytolaccaceæ*), collected in autumn.

Cylindrical, somewhat tapering, sparingly branched, 3 to 7 Cm. thick, mostly in transverse or longitudinal slices; externally yellowish-brown, finely longitudinally or spirally wrinkled and thickly annulate with lighter colored, low ridges; fracture fibrous, characterized by alternating layers of fibrovascular tissue and parenchyma, the layers of the latter being much retracted; odor slight; taste sweetish, afterwards highly acrid.

Average dose.— { Emetic, 1 Gm. (15 grains).
Alterative, 0.125 Gm. = 125 milligrammes (2 grains).

PILOCARPINÆ HYDROCHLORIDUM

Pilocarpine Hydrochloride

$C_{11}H_{16}N_2O_2.HCl = 242.81$

[PILOCARPINÆ HYDROCHLORAS, PHARM. 1890]

The hydrochloride [$HCl.C_{11}H_{16}N_2O_2$] of an alkaloid obtained from Pilocarpus. It should be kept in well-stoppered, amber-colored vials.

Colorless, or white, transparent crystals, odorless, and having a faintly bitter taste; deliquescent on exposure to the air. It contains no water of crystallization.

Soluble in 0.3 part of water, 2.3 parts of alcohol, and in 540 parts of chloroform at 25° C. (77° F.); soluble in 1.1 parts of alcohol at 60° C. (140° F.); insoluble in ether.

After drying for several hours at 100° C. (212° F.), the salt melts at 195.9° C. (384.5° F.), and upon ignition it is entirely consumed.

Its aqueous solution is neutral, or has a faintly acid reaction upon blue litmus paper.

Sulphuric acid dissolves Pilocarpine Hydrochloride, with elimination of hydrochloric acid gas and the formation of a colorless liquid; upon adding to the solution a small fragment of potassium dichromate on a white porcelain surface, a bright, grass-green color is produced.

If 0.01 to 0.02 Gm. of the salt be dissolved in 2 Cc. of water in a test-tube, 2 Cc. of a slightly acid solution of hydrogen dioxide added, and a small layer of benzene be carefully poured upon the liquid, then if 3 or 4 drops of a solution of potassium dichromate (1 in 300) be added and the mixture be gently shaken, the benzene layer will acquire a violet color, while the aqueous layer will remain yellow (distinction from *other alkaloids*. If more than 0.02 Gm. be used, the benzene turns blue, and the reaction is no longer characteristic).

On rubbing together equal parts of Pilocarpine Hydrochloride and mercurous chloride, a black color is produced.

Silver nitrate T.S. produces, in an aqueous solution of the salt, a white precipitate insoluble in nitric acid.

Average dose.— 0.010 Gm. = 10 milligrammes ($\frac{1}{6}$ grain).

PILOCARPINÆ NITRAS

Pilocarpine Nitrate

$C_{11}H_{16}N_2O_2.HNO_3 = 269.20$

The nitrate [$NO_2OH.C_{11}H_{16}N_2O_2$] of an alkaloid obtained from Pilocarpus. It should be kept in well-stoppered, amber-colored vials.

Colorless, or white, shining crystals, odorless, and having a faintly bitter taste; permanent in the air. It contains no water of crystallization.

Soluble in 4 parts of water and in 60 parts of alcohol, at 25° C. (77° F.); soluble in 16 parts of alcohol at 60° C. (140° F.); insoluble in ether and chloroform.

It melts at 170.9° C. (339.7° F.). Upon ignition, it is quickly consumed, leaving no residue.

The aqueous solution (1 in 100) shows an acid reaction to blue litmus paper.

Sulphuric acid dissolves Pilocarpine Nitrate, forming a colorless solution, and on adding a fragment of potassium dichromate, a bright grass-green color is produced.

On rubbing together equal parts of the salt and mercurous chloride, no black color is produced (distinction from *pilocarpine hydrochloride*).

If 0.01 to 0.02 Gm. of the salt be dissolved in 2 Cc. of water in a test-tube, 2 Cc. of a slightly acid solution of hydrogen dioxide added, and a small layer of benzene be carefully poured upon the liquid, then if 3 or 4 drops of a solution of potassium dichromate (1 in 300) be added and the mixture be gently shaken, the benzene layer will acquire a violet color, while the aqueous layer will remain yellow (distinction from *other alkaloids*. If more than 0.02 Gm. be used, the benzene turns blue and the reaction is no longer characteristic).

If to an aqueous solution of the salt, mixed with an equal volume of ferrous sulphate T.S., sulphuric acid be carefully added without shaking, a brown ring will appear at the juncture of the two layers.

Average dose.— 0.010 Gm. = 10 milligrammes ($\frac{1}{6}$ grain).

[illegible]

[illegible]

[illegible]

PILOCARPINÆ HYDROCHLORIDUM

Pilocarpine Hydrochloride

[illegible]

[illegible] obtained from [illegible] amber-colored vials.

[illegible] faintly bitter [illegible] to the air. It [illegible] in water [illegible]

Soluble in 0.3 part of water, 2.3 parts of alcohol, and in 540 parts of chloroform at 25° C. (77° F.); soluble in 1.1 parts of alcohol at 60° C. (140° F.); insoluble in ether.

After drying for several hours at 100° C. (212° F.), the salt melts at 195.9° C. (384.5° F.), and upon ignition it is entirely consumed.

Its aqueous solution is neutral, or has a faintly acid reaction upon blue litmus paper.

Sulphuric acid dissolves Pilocarpine Hydrochloride, with elimination of hydrochloric acid gas and the formation of a colorless liquid; upon adding to the solution a small fragment of potassium dichromate on a white porcelain surface, a bright, grass-green color is produced.

If 0.01 to 0.02 Gm. of the salt be dissolved in 2 Cc. of water in a test-tube, 2 Cc. of a slightly acid solution of hydrogen dioxide added, and a small layer of benzene be carefully poured upon the liquid, then if 3 or 4 drops of a solution of potassium dichromate (1 in 300) be added and the mixture be gently shaken, the benzene layer will acquire a violet color, while the aqueous layer will remain yellow (distinction from *other alkaloids*. If more than 0.02 Gm. be used, the benzene turns blue, and the reaction is no longer characteristic).

On rubbing together equal parts of Pilocarpine Hydrochloride and mercurous chloride, a black color is produced.

Silver nitrate T.S. produces, in an aqueous solution of the salt, a white precipitate insoluble in nitric acid.

Average dose.— 0.010 Gm. = 10 milligrammes ($\frac{1}{5}$ grain).

PILOCARPINÆ NITRAS

Pilocarpine Nitrate

$C_{11}H_{16}N_2O_2.HNO_3 = 269.20$

The nitrate [$NO_2OH.C_{11}H_{16}N_2O_2$] of an alkaloid obtained from Pilocarpus. It should be kept in well-stoppered, amber-colored vials.

Colorless, or white, shining crystals, odorless, and having a faintly bitter taste; permanent in the air. It contains no water of crystallization.

Soluble in 4 parts of water and in 60 parts of alcohol, at 25° C. (77° F.); soluble in 16 parts of alcohol at 60° C. (140° F.); insoluble in ether and chloroform.

It melts at 170.9° C. (339.7° F.). Upon ignition, it is quickly consumed, leaving no residue.

The aqueous solution (1 in 100) shows an acid reaction to blue litmus paper.

Sulphuric acid dissolves Pilocarpine Nitrate, forming a colorless solution, and on adding a fragment of potassium dichromate, a bright grass-green color is produced.

On rubbing together equal parts of the salt and mercurous chloride, no black color is produced (distinction from *pilocarpine hydrochloride*).

If 0.01 to 0.02 Gm. of the salt be dissolved in 2 Cc. of water in a test-tube, 2 Cc. of a slightly acid solution of hydrogen dioxide added, and a small layer of benzene be carefully poured upon the liquid, then if 3 or 4 drops of a solution of potassium dichromate (1 in 300) be added and the mixture be gently shaken, the benzene layer will acquire a violet color, while the aqueous layer will remain yellow (distinction from *other alkaloids*. If more than 0.02 Gm. be used, the benzene turns blue and the reaction is no longer characteristic).

If to an aqueous solution of the salt, mixed with an equal volume of ferrous sulphate T.S., sulphuric acid be carefully added without shaking, a brown ring will appear at the juncture of the two layers.

Average dose.— 0.010 Gm. = 10 milligrammes ($\frac{1}{5}$ grain).

PILOCARPUS

Pilocarpus

The leaflets of *Pilocarpus Jaborandi* Holmes or of *Pilocarpus microphyllus* Stapf (Fam. *Rutaceæ*), yielding, when assayed by the process given below, not less than 0.5 percent. of alkaloids.

Pilocarpus Jaborandi.—Very shortly and stoutly petioluled, the blades 6 to 12 Cm. long and 2 to 4 Cm. broad, oblong or oval, mostly unequal at the base, blunt and emarginate at the summit, the margin entire and narrowly revolute; yellowish-green, very smooth, shining, thick and coriaceous, the reticulate venation prominent on both sides, especially beneath; strongly pellucid-glandular; peculiarly aromatic when crushed; taste bitterish, slightly salty, aromatic, later somewhat pungent and sialagogue.

Pilocarpus microphyllus.—Leaflets 1.2 to 3.7 Cm. long, 0.8 to 1.6 Cm. broad; the lateral without petiolules, rhomboidally oval to obovate, acute at the base, blunt and unequally emarginate at the summit; the terminal on short, margined petiolules, almost equally oval to obovate, rather narrower than the lateral; all thickish and rigid, with entire margin, smooth and dull green, finely pellucid-glandular; midrib stout, the veins rather coarsely reticulate, lightly prominent; almost odorless; taste similar to that of *Pilocarpus Jaborandi.*

Assay of Pilocarpus

Pilocarpus, in No. 60 powder, *ten grammes*	10 Gm.

Chloroform,
Ammonia Water,
Normal Sulphuric Acid V.S.,
Tenth-normal Sulphuric Acid V.S.,
Fiftieth-normal Potassium Hydroxide V.S.,
Cochineal T.S. or **Iodeosin T.S.**, each, *a sufficient quantity.*

Moisten the Pilocarpus with 2 Cc. of ammonia water and 3 Cc. of chloroform, and at once pack it firmly in a small cylindrical percolator, which has been provided with a pledget of cotton packed firmly in the neck. Percolate the powder slowly with chloroform containing about 2 percent. of ammonia water, until it is exhausted, about 100 Cc. of menstruum usually being sufficient. Pour into a separator the percolate, and shake it out with 15 Cc. of normal sulphuric acid V.S., transferring the acid aqueous layer to another separator, and repeating the shaking out of the chloroform solution with 2 Cc. of normal sulphuric acid V.S., mixed with 8 Cc. of distilled water. Add the acid layer to the second separator, and again repeat the shaking out with 10 Cc. of distilled water, and add the aqueous liquid to the second separator. Introduce into the second separator a small piece of red litmus paper, add enough ammonia water to render the liquid alkaline, and shake out the liquid with 20 Cc. of chloroform, drawing off the chloroformic solution into a beaker. Repeat the shaking out with two portions of 15 and 10 Cc. each of chloroform, and add the chloroformic solutions to the beaker. Evaporate the chloroform by means of a water-bath, and dissolve the alkaloidal residue in 7 Cc. of tenth-normal sulphuric acid V.S. Add 5 drops of cochineal T.S. or iodeosin T.S., and titrate the excess of acid with fiftieth-normal potassium hydroxide V.S. Divide the number of cubic centimeters of fiftieth-normal potassium hydroxide V.S. used, by 5, subtract the quotient from 7 (the 7 Cc. of tenth-normal sulphuric acid V.S. taken), and multiply the remainder by 0.02, and this product by 10; the result will be the percentage of alkaloids contained in the Pilocarpus. The figure 0.02 represents the weight in grammes of alkaloids (mainly pilocarpine) required to neutralize 1 Cc. of tenth-normal sulphuric acid V.S.

Average dose.—2 Gm. (30 grains).

PILULÆ ALOES

Pills of Aloes

Purified Aloes, in fine powder, *thirteen grammes*	13 Gm.
Soap, in fine powder, *thirteen grammes*	13 Gm.
Water, *a sufficient quantity*,	
To make *one hundred pills*	100

Mix the powders intimately, then incorporate sufficient Water to form a mass, and divide it into *one hundred pills.*

Average dose.— 2 pills.

PILULÆ ALOES ET FERRI

Pills of Aloes and Iron

Purified Aloes, in fine powder, *seven grammes*	7 Gm.
Exsiccated Ferrous Sulphate, *seven grammes*	7 Gm.
Aromatic Powder, *seven grammes*	7 Gm.
Confection of Rose, *a sufficient quantity*,	
To make *one hundred pills*	100

Mix the powders intimately, then incorporate sufficient Confection of Rose to form a mass, and divide it into *one hundred pills.*

Average dose.— 2 pills.

PILULÆ ALOES ET MASTICHES

Pills of Aloes and Mastic

Purified Aloes, in fine powder, *thirteen grammes*	13 Gm.
Mastic, in fine powder, *four grammes*	4 Gm.
Red Rose, in fine powder, *three grammes*	3 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make *one hundred pills*	100

Mix the powders intimately, then incorporate sufficient Diluted Alcohol to form a mass, and divide it into *one hundred pills.*

Average dose.— 2 pills.

PILULÆ ALOES ET MYRRHÆ

Pills of Aloes and Myrrh

Purified Aloes, in fine powder, *thirteen grammes*	13 Gm.
Myrrh, in fine powder, *six grammes*	6 Gm.
Aromatic Powder, *four grammes*	4 Gm.
Syrup, *a sufficient quantity*,	
To make *one hundred pills*	100

Mix the powders intimately, then incorporate sufficient Syrup to form a mass, and divide it into *one hundred pills*.

Average dose.—2 pills.

PILULÆ ASAFŒTIDÆ

Pills of Asafetida

Asafetida, *twenty grammes*	20 Gm.
Soap, in fine powder, *six grammes*	6 Gm.
Water, *a sufficient quantity,*	
To make *one hundred pills*	100

Beat the solids together with Water, so as to form a mass, and divide it into *one hundred pills*.

Average dose.—2 pills.

PILULÆ CATHARTICÆ COMPOSITÆ

Compound Cathartic Pills

Compound Extract of Colocynth, *eighty grammes*	80 Gm.
Mild Mercurous Chloride, *sixty grammes*	60 Gm.
Resin of Jalap, in fine powder, *twenty grammes*	20 Gm.
Gamboge, in fine powder, *fifteen grammes*	15 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand pills*	1000

Mix the powders intimately, then incorporate a sufficient quantity of Diluted Alcohol to form a mass, and divide it into *one thousand pills*.

Average dose.—2 pills.

PILULÆ CATHARTICÆ VEGETABILES

Vegetable Cathartic Pills

Compound Extract of Colocynth, *sixty grammes*	60 Gm.
Extract of Hyoscyamus, *thirty grammes*	30 Gm.
Resin of Jalap, in fine powder, *twenty grammes*	20 Gm.
Extract of Leptandra, *fifteen grammes*	15 Gm.
Resin of Podophyllum, *fifteen grammes*	15 Gm.
Oil of Peppermint, *eight cubic centimeters*	8 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand pills*	1000

Mix the Compound Extract of Colocynth intimately with the Resin of Podophyllum, Resin of Jalap, and Extract of Leptandra, and then add the Oil of Peppermint. Rub the Extract of Hyoscyamus with enough Diluted Alcohol to render it plastic, then incorporate it with the mixture first prepared, using a sufficient quantity of Diluted Alcohol to form a mass, and divide it into *one thousand pills.*

Average dose.— 2 pills.

PILULÆ FERRI CARBONATIS

Pills of Ferrous Carbonate

Granulated Ferrous Sulphate, *sixteen grammes*	16 Gm.
Potassium Carbonate, *eight grammes*	8 Gm.
Sugar, *four grammes*	4 Gm.
Tragacanth, in fine powder, *one gramme*	1 Gm.
Althæa, in No. 60 powder, *one gramme*	1 Gm.
Glycerin,	
Water, each, *a sufficient quantity,*	
To make *one hundred pills*	100

Rub the Potassium Carbonate, in a mortar, with a sufficient quantity (about *ten drops* each) of Glycerin and Water, then add the Ferrous Sulphate and Sugar, previously triturated together to a uniform powder, and rub the mass thoroughly, until it assumes a greenish color. When the reaction has terminated, incorporate the Tragacanth and Althæa, and, if necessary, add a little more Water, so as to obtain a mass of pilular consistence. Divide this into *one hundred pills.*

These pills should be freshly prepared when wanted.

Average dose.— 2 pills.

PILULÆ FERRI IODIDI

Pills of Ferrous Iodide

Reduced Iron, *four grammes*	4 Gm.
Iodine, *five grammes*	5 Gm.
Glycyrrhiza, in No. 60 powder, *four grammes*	4 Gm.
Sugar, in fine powder, *four grammes*	4 Gm.
Extract of Glycyrrhiza, in fine powder, *one gramme*	1 Gm.
Acacia, in fine powder, *one gramme*	1 Gm.
Water,	
Balsam of Tolu,	
Ether, each, *a sufficient quantity,*	
To make *one hundred pills*	100

To the Reduced Iron, contained in a small mortar, add *six cubic centimeters* of Water, and then, gradually, the Iodine with constant stirring, Triturate the Resin of Podophyllum, Capsicum, Sugar of Milk, and Acacia together to produce a uniform powder. Incorporate with this the Extract of Belladonna Leaves and sufficient of a mixture of equal parts of Glycerin and Syrup to form a mass; divide it into ***one hundred pills.***

Average dose.— 1 pill.

PILULÆ RHEI COMPOSITÆ

Compound Pills of Rhubarb

Rhubarb, in No. 60 powder, *thirteen grammes*	13.0 Gm.
Purified Aloes, in fine powder, *ten grammes*	10.0 Gm.
Myrrh, in fine powder, *six grammes*	6.0 Gm.
Oil of Peppermint, *one-half cubic centimeter*	0.5 Cc.
Water, *a sufficient quantity,*	
To make *one hundred pills* . .	100

Mix the Oil of Peppermint intimately with the powders, then incorporate sufficient Water to form a mass; divide it into ***one hundred pills.***

Average dose.— 2 pills.

PIMENTA

Pimenta

The dried, nearly ripe fruit of *Pimenta officinalis* Lindley (Fam. *Myrtaceæ*).

Subglobular, 5 to 7 Mm. in diameter, crowned with a short, 4-parted calyx and a short style, or their remnants; externally dark brown; pericarp brittle, about 1 Mm. thick, glandular-punctate; 2-celled, each cell containing one reddish-brown, plano-convex, slightly reniform seed; odor and taste peculiarly and agreeably aromatic.

Average dose.— 1 Gm. (15 grains).

PIPER

Pepper

The dried, unripe fruit of *Piper nigrum* Linné (Fam. *Piperaceæ*).

Nearly globular, 4 to 5 Mm. in diameter, externally brownish- or grayish-black; pericarp thin, coarsely wrinkled, enclosing a single whitish, more or less imperfectly developed seed; odor strong, penetrating, provoking sneezing; taste aromatic and very pungent.

The starch grains present in the powder are nearly spherical and about 0.002 Mm. in diameter; ash not more than 7 percent.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

PIPERINA

Piperine

$C_{17}H_{19}NO_3 = 283.04$

[PIPERINUM, PHARM. 1890]

A feebly basic substance [$CH_2O_2.C_6H_3.CH:CH.CH:CH.CON.C_5H_{10}$] obtained from Pepper and other plants of the *Piperaceæ*.

Colorless or pale yellowish, glistening, monoclinic crystals, odorless, permanent in the air, and containing no water of crystallization. When put into the mouth, it is at first tasteless, but on prolonged contact it develops a sharp, biting taste. It is optically inactive.

Insoluble in water; soluble in 15 parts of alcohol, 36 parts of ether, and in 1.7 parts of chloroform at 25° C. (77° F.); soluble in 4.4 parts of alcohol at 60° C. (140° F.).

It melts at 130° C. (266° F.). Upon ignition, it emits alkaline vapors, and is completely consumed.

Its alcoholic solution is neutral to litmus paper.

Sulphuric acid dissolves Piperine with the formation of a blood-red color, which disappears on dilution with water.

On heating Piperine with alcoholic potassium hydroxide, it is converted into piperinic acid and piperidine, the latter recognizable by its alkaline, pepper-like odor, and the former by its melting point, 215° C. (419° F.).

On adding a crystal of Piperine to sulphuric acid containing about half its volume of solution of formaldehyde, a permanently green liquid is formed.

On adding a crystal of Piperine to sulphuric acid containing a fragment of potassium dichromate, it at once acquires a purple color, and, on stirring, dissolves, forming a reddish-brown solution, which becomes greenish on adding water to it.

On adding a crystal of Piperine to sulphuric acid containing a trace of selenous acid, it turns brown, changing at once to violet, and dissolves, forming a brown solution changing to green.

When heated with nitric acid, Piperine is colored at first orange, then red, and the acid acquires a yellow color, deepening to reddish as the crystals dissolve. On adding to this solution an excess of potassium hydroxide T.S., the color is at first yellow, but upon boiling, it becomes blood-red.

Average dose.—0.200 Gm. = 200 milligrammes (3 grains).

PIX LIQUIDA

Tar

A product obtained by the destructive distillation of the wood of *Pinus palustris* Miller, or of other species of Pinus (Fam. *Pinaceæ*).

Semi-liquid, viscid, blackish-brown, non-crystalline, translucent in thin layers, becoming granular and opaque with age; odor empyreumatic, terebinthinate; taste sharp and empyreumatic.

Tar is miscible with alcohol and fixed or volatile oils; it is heavier than water and is slightly soluble in it, the solution being of a pale yellowish-brown color and having an acid reaction.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

PLUMBI ACETAS

Lead Acetate

$Pb(C_2H_3O_2)_2 + 3H_2O = 376.15$

It should contain not less than 99.5 percent. of pure Lead Acetate [$(CH_3.COO)_2Pb + 3H_2O$], and should be kept in well-stoppered bottles.

Colorless, shining, transparent, monoclinic prisms or plates, or heavy, white, crystalline masses, or granular crystals, having a faintly acetous odor, and a sweetish, astringent, afterwards metallic taste. Efflorescent, and absorbing carbon dioxide, on exposure to the air.

Soluble in 2 parts of water, and in 30 parts of alcohol at 25° C. (77° F.); in 0.5 part of boiling water, and in 1 part of boiling alcohol.

When heated to 40° C. (104° F.), the salt loses its water of crystallization (14.26 percent.). When heated rapidly to 75° C. (167° F.) it fuses in its water of crystallization, and at a higher temperature is converted into a pulverulent basic salt which fuses at about 280° C. (536° F.) with continued loss of acetic acid, finally decomposing with the evolution of carbon dioxide and acetone, leaving a residue of finely divided metallic lead mixed with oxide and carbonate.

On heating the salt with sulphuric acid, vapors of acetic acid are evolved.

The aqueous solution of Lead Acetate has a neutral or slightly alkaline reaction, and yields a black precipitate with hydrogen sulphide T.S., a yellow one with potassium iodide T.S., and a white one with diluted sulphuric acid.

A solution of the salt (1 in 10), prepared with water which has been recently boiled, should be clear, or only slightly opalescent (limit of *carbonate*), and should yield, with potassium ferrocyanide T.S., a pure white precipitate (absence of *iron* and *copper*).

If to the aqueous solution of the salt (1 in 10), hydrochloric acid be added until no further precipitate is produced, the remainder of the lead removed from the filtrate by hydrogen sulphide, and the liquid filtered, a portion of the second filtrate should not upon the addition of ammonia water yield more than a slight precipitate (limit of *zinc* and *iron*).

If another portion of the filtrate be evaporated to dryness, it should not leave more than a slight residue after gentle ignition (limit of *salts* of the *alkali metals*, and those of *magnesium*, *calcium*, *zinc*, and *iron*).

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

PLUMBI IODIDUM

Lead Iodide

$PbI_2 = 457.15$

It should contain not less than 99 percent. of pure Lead Iodide, and should be kept in well-stoppered bottles, protected from light.

A heavy, bright yellow powder, without odor or taste; permanent in the air.

Soluble in about 1300 parts of water at 25° C. (77° F.), and in about 200 parts of boiling water, separating from the latter solution on cooling in brilliant, golden-yellow crystalline laminæ; very slightly soluble in alcohol, but soluble, without color, in solutions of the fixed alkalies, in concentrated solutions of the alkali acetates, of potassium iodide, and of sodium thiosulphate, and in a hot solution of ammonium chloride.

When moderately heated, the salt fuses to a thick, reddish-brown liquid, which congeals, on cooling, to a yellow, crystalline mass. At a higher temperature it is decomposed, with the evolution of violet vapors of iodine, leaving a lemon-yellow residue of lead oxyiodide.

If 1 Gm. of the salt be triturated with 2 Gm. of ammonium chloride and 2 Cc. of water, a nearly white mixture will result. If this be transferred to a test-tube, and heated in a water-bath for a few minutes, a clear and almost colorless solution should be formed (absence of *chromate* and *other insoluble foreign salts*). On cooling this solution, a solid mass of nearly colorless, fine, silky crystals will be produced, and on adding water or diluted sulphuric acid to this mass, yellow Lead Iodide will separate.

Add 0.1 Gm. of the salt to 5 Cc. of water, and heat the mixture until it boils; cool the liquid and filter it into a test-tube of about 40 Cc. capacity, then add 5 Cc. of potassium hydroxide T.S. and about 0.2 Gm. of aluminum wire, insert in the upper portion of the test-tube a pledget of purified cotton, and over the mouth, place a piece of moistened red litmus paper; then if the tube be heated on a water-bath for fifteen minutes, no blue coloration of the paper should be discernible (limit of *nitrate*).

If 1 Gm. of Lead Iodide be boiled for a few minutes with 20 Cc. of water, the mixture then cooled and filtered, and the lead removed from the filtrate by hydrogen sulphide, a portion of the second filtrate, after boiling to drive off hydrogen sulphide and carefully neutralizing with ammonia water, should not be colored red by a drop of ferric chloride T.S. (absence of *acetate*).

Another portion of this filtrate, if evaporated to dryness, should leave no residue (absence of *soluble foreign salts*).

PLUMBI NITRAS

Lead Nitrate

$Pb(NO_3)_2 = 328.49$

It should contain not less than 99.5 percent. of pure Lead Nitrate $[(NO_2.O)_2Pb]$, and should be kept in well-closed vessels.

Colorless, transparent, octahedral crystals, when obtained by the spontaneous evaporation of cold solutions, or white, nearly opaque crystals, when formed by the cooling of hot solutions; without odor, and having a sweetish, astringent, afterwards metallic, taste; permanent in the air.

Soluble in 1.85 parts of water at 25° C. (77° F.), and in 0.75 part of boiling water; almost insoluble in alcohol.

When strongly heated, the salt decrepitates, emits nitrous vapors, and finally leaves a residue of lead oxide.

The aqueous solution of the salt has an acid reaction upon blue litmus paper, and yields a black precipitate with hydrogen sulphide T.S., a yellow one with potassium iodide T.S., and a white one with diluted sulphuric acid.

The aqueous solution of the salt (1 in 10) should give, with potassium ferrocyanide T.S., a pure white precipitate (absence of *copper* and *iron*).

If hydrochloric acid be added to the aqueous solution of the salt (1 in 10) until no further precipitate is produced, and the remainder of the lead be removed from the filtrate by hydrogen sulphide, a portion of the second filtrate should not yield more than a slight precipitate upon the addition of ammonia water (limit of *zinc* and *iron*).

Another portion of this filtrate, when evaporated to dryness, should not leave more than a slight residue after gentle ignition (limit of *salts* of the *alkalies* and those of *magnesium*, *calcium*, *zinc*, and *iron*).

PLUMBI OXIDUM

Lead Oxide

$PbO = 221.23$

It should contain not less than 96 percent. of pure Lead Oxide, and should be kept in well-closed vessels.

A heavy, yellowish or reddish-yellow powder, or minute scales, without odor or taste. On exposure to the air it slowly absorbs moisture and carbon dioxide.

Almost insoluble in water, to which it, however, imparts a faintly alkaline reaction; insoluble in alcohol, but soluble in acetic or diluted nitric acid, and in warm solutions of the fixed alkali hydroxides.

When heated, the Oxide assumes a brownish-red color, becoming yellow again on cooling; it fuses at a red heat. When heated in contact with charcoal, it is reduced to metallic lead.

Lead Oxide should be soluble in diluted nitric acid, with but little effervescence (limit of *carbonate*), and without the development of the odor of nitrous acid (absence of *lead*), leaving not more than a trifling residue (limit of *silicates, barium sulphate*, etc.).

The solution in diluted nitric acid, which should be colorless, when nearly neutralized by ammonia water yields with hydrogen sulphide T.S. a black precipitate, with potassium iodide T.S. a yellow one, and with diluted sulphuric acid a white precipitate, the latter two being soluble in a strong solution of sodium hydroxide.

If from the solution in diluted nitric acid the lead be precipitated by sulphuric acid, the filtrate, after the addition of an excess of ammonia water, should not assume more than a slight bluish tint (limit of *copper*), nor yield more than traces of a reddish-brown precipitate (limit of *iron*).

If 5 Gm. of the Oxide contained in a small flask be shaken with 5 Cc. of water, then 20 Cc. of acetic acid added, and the mixture boiled for a few minutes and filtered, the insoluble residue, when well washed and dried, should not weigh more than 0.2 Gm. (absence of more than 4 percent. of *insoluble impurities*).

If, to the mixed filtrate and washings obtained in the last test, hydrochloric acid be added until no further precipitate be produced, the remainder of the lead removed from the filtrate by hydrogen sulphide, and the liquid filtered, the second filtrate, upon evaporation to dryness, should not yield a residue weighing more than 0.050 Gm. (limit of *soluble impurities*).

When strongly heated in a porcelain crucible, the Oxide should not lose more than 4 percent. of its weight (limit of *carbonate* and of *moisture*).

PODOPHYLLUM

Podophyllum

The dried rhizome of *Podophyllum peltatum* Linné (Fam. *Berberidaceæ*).

Of horizontal growth and variable length, subcylindrical, flattened above, sometimes branched, consisting of joints 5 to 10 Cm. long, the internodes 2 to 8 Mm. thick; externally pale yellowish-brown to dark brown, nearly smooth; nodes annulate, the upper surface being marked by large cup-shaped scars, the lower surface with numerous root-scars or remains of roots; fracture short, the fractured surface mealy or horny, whitish to pale brown, with a circle of small wood-bundles, and a large pith; odor slight, more pronounced and characteristic in the powder; taste sweetish and disagreeably bitter and acrid.

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

POTASSII ACETAS

Potassium Acetate

$KC_2H_3O_2 = 97.44$

It should contain, when thoroughly dried, not less than 98 percent. of pure Potassium Acetate [$CH_3.COOK$], and should be kept in well-stoppered bottles.

A white powder, or in crystalline masses of a satin-like lustre, odorless, and having a warming, saline taste. Very deliquescent on exposure to the air.

Soluble in 0.4 part of water, and in 2 parts of alcohol at 25° C. (77° F.); with increasing temperature it becomes much more soluble in both liquids.

When heated to 292° C. (557.6° F.), the salt fuses. At a higher temperature it decomposes, blackens, and evolves vapors having an empyreumatic odor (an alliaceous odor would indicate the presence of *arsenic*), and finally, if ignited on platinum, it leaves a white residue, which should be completely soluble in water.

The aqueous solution (1 in 20) is alkaline to red litmus paper, but does not affect phenolphthalein T.S.

The addition of sodium bitartrate T.S. to the concentrated aqueous solution of the salt causes a white, crystalline precipitate.

If a few particles of the salt be added to a mixture of 1 Cc. of sulphuric acid and 1 Cc. of alcohol, acetic ether will be formed, recognizable by its odor.

The addition of a little ferric chloride T.S. to a solution of the salt produces a deep red color, and, upon boiling, a pale brown, flocculent precipitate of basic ferric acetate separates.

The aqueous solution of the salt (1 in 20), slightly acidulated with acetic acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Five Cc. of an aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 1 Gm. of dry Potassium Acetate be thoroughly carbonized at a temperature not exceeding red heat, and the residue extracted with boiling distilled water until the washings cease to react with methyl-orange T.S., the mixed filtrate and washings should require for complete neutralization not less than 20.1 Cc. of half-normal sulphuric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.— 2 Gm. (30 grains).

POTASSII BICARBONAS

Potassium Bicarbonate

$KHCO_3 = 99.41$

It should contain not less than 99 percent. of pure Potassium Bicarbonate [$CO(OH)(OK)$], and should be kept in well-stoppered bottles.

Colorless, transparent, monoclinic prisms, or a colorless, odorless, granular powder, having a saline and slightly alkaline taste. Permanent in the air.

Soluble in about 3 parts of water at 25° C. (77° F.), and in 1.9 parts at 50° C. (122° F.). At a higher temperature the solution rapidly loses carbon dioxide, and, after being boiled, contains only potassium carbonate. Almost insoluble in alcohol.

The dry salt begins to lose carbon dioxide at 100° C. (212° F.), and this loss increases at a higher temperature, until, at a red heat, the salt has lost 30.96 percent. of its original weight, leaving a residue of carbonate.

The concentrated aqueous solution of the salt is slightly alkaline to litmus paper, but neutral to phenolphthalein T.S.

Tartaric acid T.S., added in excess to the concentrated aqueous solution, produces a white, crystalline precipitate.

If 1 Gm. of the salt be dissolved without agitation in 20 Cc. of water at a temperature not above 15° C. (59° F.), and 0.2 Cc. of normal hydrochloric acid V.S. and 2 drops of phenolphthalein T.S. be added, a red tint should not appear immediately (limit of *carbonate*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

To neutralize 1 Gm. of Potassium Bicarbonate not less than 19.9 Cc. of half-normal sulphuric acid V.S. should be required, methyl-orange T.S. being used as indicator.

Average dose.— 2 Gm. (30 grains).

POTASSII BITARTRAS

Potassium Bitartrate

$KHC_4H_4O_6 = 186.78$

It should contain not less than 99 percent. of pure Potassium Bitartrate [$C_2H_2(OH)_2(COOH)(COOK)$], and should be kept in well-stoppered bottles.

Colorless or slightly opaque, rhombic crystals, or a white, somewhat gritty powder, odorless, and having a pleasant, acidulous taste. Permanent in the air.

Soluble in about 200 parts of water at 25° C. (77° F.), and in 16.7 parts of boiling water; very sparingly soluble in alcohol.

When a small portion of the salt is heated on platinum foil, it chars and emits inflammable vapors having the odor of burning sugar. At a higher temperature, with free access of air, the carbon of the black residue is oxidized, and a white, fused mass remains, which has an alkaline reaction and effervesces strongly with acids.

The aqueous solution of the salt has an acid reaction upon blue litmus paper.

With sodium cobaltic nitrite T.S. the aqueous solution of the salt yields a copious yellow precipitate.

In the aqueous solution of the salt, rendered neutral by potassium hydroxide T.S., silver nitrate T.S. produces a white precipitate, which, on boiling, becomes black through the separation of metallic silver. If, before applying heat, just sufficient ammonia water be added to dissolve the white precipitate, and the solution boiled, a mirror will be deposited on the sides of the test-tube.

A solution of 0.5 Gm. of the salt in 3 Cc. of ammonia water should leave no insoluble residue (absence of *starch*, *kaolin*, *calcium phosphate*, and other *insoluble matter*).

The aqueous solution of the salt, slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

The odor of *ammonia* should not be evolved on heating the salt with a slight excess of potassium hydroxide T.S.

If 1 Gm. of Potassium Bitartrate be well triturated with about 1 Gm. of potassium carbonate and 0.5 Gm. of potassium nitrate, and the mixture heated gradually to dull redness in a porcelain crucible, and if, upon cooling, the resulting mass be treated with a slight excess of diluted hydrochloric acid and filtered, the filtrate, upon being made slightly alkaline with potassium hydroxide T.S., should not yield a gelatinous precipitate soluble in excess of the reagent (absence of *alum*). If a precipitate be produced which is insoluble, it should be collected and thoroughly washed with hot distilled water and dissolved in hot diluted nitric acid; the addition of an excess of ammonium molybdate T.S. to this solution should not produce a yellow precipitate (absence of *phosphates*).

If 1 Gm. of Potassium Bitartrate be thoroughly carbonized at a temperature not exceeding red heat, and the residue extracted with boiling distilled water until the washings cease to react with methyl-orange T.S., the mixed filtrate and washings should require for complete neutralization not less than 10.6 Cc. of half-normal sulphuric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.—Diuretic, 2 Gm. (30 grains).

POTASSII BROMIDUM

Potassium Bromide

KBr = 118.22

It should contain not less than 97 percent. of pure Potassium Bromide, and should be kept in well-stoppered bottles.

Colorless, or white, cubical crystals, or a granular powder; odorless, and having a strongly saline taste. Permanent in the air.

Soluble in about 1.5 parts of water, and in about 180 parts of alcohol at 25° C. (77° F.); in less than 1 part of boiling water, and in 16 parts of boiling alcohol; also soluble in glycerin.

On heating the salt upon platinum foil it decrepitates; and at a temperature near 700° C. (1292° F.) it fuses without decomposing, and at a bright red heat volatilizes, communicating a violet color to the flame.

Its aqueous solution (1 in 20) is neutral, or has only a scarcely perceptible alkaline reaction upon litmus paper.

The addition of tartaric acid T.S., or of sodium bitartrate T.S., to a concentrated aqueous solution of the salt produces a white crystalline precipitate.

Silver nitrate T.S. produces a yellowish-white precipitate, insoluble in nitric acid and in a moderate excess of ammonia water.

If 1 Gm. of Potassium Bromide be dissolved in 10 Cc. of water and 0.1 Cc. of tenth-normal sulphuric acid V.S. be added, no color should be produced by the subsequent addition of a drop of phenolphthalein T.S., even after heating (limit of *alkali*).

If diluted sulphuric acid be dropped upon crushed crystals of the salt, and the mixture be shaken with 1 Cc. of chloroform, the latter should not assume a yellowish-brown color (absence of *bromate*).

If to 10 Cc. of the aqueous solution of the salt (1 in 20), 1 Cc. of chloroform be added, and if chlorine water, which has been diluted with an equal volume of water, be introduced cautiously drop by drop with constant agitation, the liberated bromine will dissolve in the chloroform, imparting to it a yellow to orange color, free from any violet tint (absence of *iodides*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Ten Cc. of the aqueous solution [illegible] when acidulated with hydrochloric acid [illegible] the addition of 1 Cc. of potassium [illegible]

[illegible] water, and 2 or [illegible] not less than [illegible] to produce a permanent [illegible]

Average dose.—[illegible] grains.

POTASSII CARBONAS

Potassium Carbonate

[illegible]

It should contain, when thoroughly dried, not less than 98 percent. of pure Potassium Carbonate [illegible] and should be kept in well-stoppered bottles.

[illegible] powder [illegible] strongly alkaline taste; [illegible]

[illegible] water [illegible] part of [illegible]

[illegible] the water which it may [illegible] white heat it [illegible]

[illegible] red litmus paper and effervesces with acids.

[illegible] and [illegible] a white [illegible]

[illegible] of water [illegible]

[illegible] Potassium Carbonate [illegible] slightly acidulated [illegible] Time-Limit Test for *heavy metals* [illegible]

[illegible] with an equal [illegible] ferrous sulphate [illegible]

[illegible] thoroughly dried [illegible] water should require not [illegible] neutralization [illegible]

Average dose.—1 Gm. (15 grains).

POTASSII CHLORAS

Potassium Chlorate

$KClO_3$ [illegible]

It should contain not less than 99 percent. of pure Potassium Chlorate ($KClO_3$ [illegible]) and should be kept in well-stoppered bottles. *Great caution should be observed in handling it, as dangerous explosions are liable to occur when it is heated or subjected to concussion or trituration* with organic substances (cork, tannic acid, sugar, etc.), or with sulphur, antimony sulphide, phosphorus, or other easily oxidizable substances.

Colorless, lustrous, monoclinic prisms or plates, or a white, granular powder; odorless, and having a cooling, characteristic taste. Permanent in the air.

Soluble in 16 parts of water at 25° C. (77° F.), and in 1.7 parts of boiling water; insoluble in absolute alcohol, and but slightly soluble in diluted alcohol.

At 334° C. (633.2° F.) the salt fuses, and above 352° C. (665.6° F.) it is decomposed into oxygen and potassium perchlorate; above 400° C. (752° F.) all of its oxygen is liberated, and a white residue of potassium chloride remains, amounting to 60.8 percent. of the pure Chlorate employed. This residue is readily soluble in water, and the solution yields a white, curdy precipitate with silver nitrate T.S.

The aqueous solution of the salt (1 in 20) is neutral to litmus paper.

With excess of tartaric acid T.S., the solution (1 in 20) slowly yields a scant, white, crystalline precipitate; with platinic chloride T.S., a yellow crystalline precipitate is produced.

When heated with hydrochloric acid, the aqueous solution (1 in 20) assumes a greenish-yellow color, and evolves chlorine.

The aqueous solution of the salt (1 in 20) should not become discolored upon the addition of ammonium sulphide T.S. (absence of *heavy metals*).

If to 1 Gm. of Potassium Chlorate contained in a test-tube of about 40 Cc. capacity, 5 Cc. of water, 5 Cc. of potassium hydroxide T.S., and about 0.2 Gm. of aluminum wire be added, and if in the upper portion of the test-tube a pledget of purified cotton be inserted, and over the mouth there be placed a piece of moistened red litmus paper, then if the tube be heated upon a water-bath for fifteen minutes, no blue coloration of the paper should be discernible (limit of *nitrates* and *nitrites*).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

POTASSII CITRAS

Potassium Citrate

$K_3C_6H_5O_7 + H_2O = 322.08$

It should contain not less than 99 percent. of pure Potassium Citrate $[C_3H_4(OH)(COOK)_3 + H_2O]$, and should be kept in well-stoppered bottles.

Transparent, prismatic crystals, or a white, granular powder, odorless, and having a cooling, saline taste. Deliquescent when exposed to the air.

Soluble in about 0.5 part of water at 25° C. (77° F.), and very soluble in boiling water; sparingly soluble in alcohol.

When heated above 100° C. (212° F.), the salt begins to lose water; at 200° C. (392° F.) the water of crystallization (5.55 percent.) is completely lost. At 230° C. (446° F.) the salt begins to decompose, turns brown, and at a higher temperature carbonizes and emits inflammable gases which have a very pungent, acid odor. At a red heat a blackened mass of potassium carbonate and carbon is left, which has an alkaline reaction, and strongly effervesces with acids.

The aqueous solution of the salt is alkaline to red litmus paper, but does not affect phenolphthalein.

An aqueous solution of Potassium Citrate yields a white, crystalline precipitate with sodium bitartrate T.S.

On mixing 10 Cc. of the aqueous solution of the salt (1 in 20) with 10 Cc. of calcium chloride T.S. the liquid remains clear until it is boiled, when a white, granular precipitate is produced.

The aqueous solution of the salt (1 in 20), slightly acidulated with acetic acid, should not respond to the Time-Limit Test for heavy *metals* (see Appendix, Test No. 2).

A solution of 1 Gm. of Potassium Citrate in 2 Cc. of water, should not deposit any precipitate on the addition of 1 Cc. of acetic acid (absence of *tartrate*).

If 1 Gm. of Potassium Citrate be thoroughly incinerated at a temperature not exceeding red heat and the residue be washed with boiling distilled water, until the washings cease to react with methyl orange T.S., the mixed filtrate and washings should require for complete neutralization not less than 18.4 Cc. of half-normal sulphuric acid V.S., methyl orange T.S. being used as indicator.

Average dose.—1 Gm. (15 grains).

POTASSII CITRAS EFFERVESCENS

Effervescent Potassium Citrate

Potassium Citrate, in [illegible] powder	200 Gm.
Sodium Bicarbonate, dried and powdered, [illegible] and [illegible] granules	477 Gm.
Tartaric Acid, dried and powdered, [illegible] and [illegible] granules	252 Gm.
Citric Acid, uneffloresced crystals, [illegible] granules	162 Gm.
To make about one thousand grammes	1000 Gm.

Dry the Potassium Citrate on a water bath until it ceases to lose weight; after powdering the dried salt, mix it intimately with the powdered Citric Acid and Tartaric Acid, then thoroughly incorporate the Sodium Bicarbonate. Place the mixed powders on a plate of glass or in a suitable dish in an oven heated between 93° and 104° C. (199.4° and 219.2° F.).

When the mixture, by the aid of careful manipulation with a wooden spatula, has acquired a moist consistence, rub it through a No. 6 tinned-iron sieve, and dry the granules at a temperature not exceeding 54° C. (129.2° F.). Keep the product in well-stoppered bottles.

Average dose.—4 Gm. (60 grains).

POTASSII CYANIDUM

Potassium Cyanide

KCN = 64.70

It should contain not less than 95 percent. of pure Potassium Cyanide, and should be kept in well-stoppered bottles.

White, opaque, amorphous pieces, or a white, granular powder, odorless when perfectly dry; deliquescent in the air and exhaling the odor of hydrocyanic acid. *Great caution should be used in tasting and handling this salt.*

Soluble in about 2 parts of water at 25° C. (77° F.). Boiling water dissolves its own weight of the salt, but rapidly decomposes it. In alcohol it is but sparingly soluble.

At a low red heat the salt fuses.

Its aqueous solution (1 in 20) has a strongly alkaline reaction upon red litmus paper, and emits the odor of hydrocyanic acid.

With an equal volume of sodium bitartrate T.S. the solution yields a white, crystalline precipitate.

With sodium cobaltic nitrite T.S. a copious yellow precipitate is produced.

A few drops of a solution of the salt (1 in 20) yields with silver nitrate T.S. a white precipitate, which is soluble in an excess of the solution of Potassium Cyanide, also in ammonia water, and in concentrated nitric acid.

If 5 Cc. of a solution of the salt (1 in 20) be shaken with a few drops of ferrous sulphate T.S. and of ferric chloride T.S., and a slight excess of hydrochloric acid then added, a blue precipitate (Prussian blue) will be produced.

The addition of diluted hydrochloric acid to the aqueous solution of the salt (1 in 20) should produce not more than a slight effervescence (limit of *carbonate*).

After the diluted hydrochloric acid has been added in slight excess, a drop of ferric chloride T.S. should produce neither a blue color (absence of *ferrocyanide*) nor a red color (absence of *sulphocyanate*).

If 1 Gm. of Potassium Cyanide be dissolved in sufficient distilled water to measure 100 Cc., then 64.7 Cc. of this solution mixed with 5 Cc. of ammonia water and 3 drops of potassium iodide T.S. should require not less than 47.5 Cc. of tenth-normal silver nitrate V.S. before the appearance of a permanent precipitate (each Cc. of the tenth-normal silver nitrate V.S. indicating 2 percent. of pure Potassium Cyanide).

Average dose.—0.010 Gm. = 10 milligrammes ($\frac{1}{5}$ grain).

POTASSII DICHROMAS

Potassium Dichromate

$K_2Cr_2O_7 = 292.28$

[POTASSII BICHROMAS, PHARM. 1890]

It should contain not less than 99 percent. of pure Potassium Dichromate [$Cr_2O_5(OK)_2$], and should be kept in well-stoppered bottles.

Large, orange-red, transparent, triclinic prisms, or four-sided tabular crystals, odorless, and having an acidulous, metallic taste. Permanent in the air.

Soluble in about 9 parts of water at 25° C. (77° F.), and in 1.5 parts of boiling water; insoluble in alcohol.

The salt fuses below a red heat, without loss of weight, forming a dark brown liquid. At a white heat it evolves oxygen and leaves a residue of neutral potassium chromate and green chromic oxide.

The aqueous solution of Potassium Dichromate (1 in 20) has an acid reaction upon blue litmus paper.

On mixing 4 Cc. of an aqueous solution (1 in 20) with 0.5 Cc. of alcohol, and then adding 1 Cc. of sulphuric acid, the liquid should assume a green color and emit the odor of aldehyde.

Sodium cobaltic nitrite T.S. produces in an aqueous solution a copious yellow precipitate.

Average dose.—0.010 Gm. = 10 milligrammes ($\frac{1}{5}$ grain).

POTASSII ET SODII TARTRAS

Potassium and Sodium Tartrate

$KNaC_4H_4O_6 + 4H_2O = 280.18$

It should contain not less than 99 percent. of pure Potassium and Sodium Tartrate [$C_2H_2(OH)_2(COOK)(COONa) + 4H_2O$], and should be kept in well-stoppered bottles.

Colorless, transparent, rhombic prisms, or a white powder, odorless, and having a cooling, saline taste. The crystals slightly effloresce in dry air.

Soluble in about 1.2 parts of water at 25° C. (77° F.), and in less than 1 part of boiling water; almost insoluble in alcohol.

When heated to 74° C. (165.2° F.), the salt fuses to a colorless liquid, which, at a higher temperature, froths, becomes brown, and gradually carbonizes, while inflammable vapors are emitted, having the odor of burning sugar. Finally, a black residue is left.

The aqueous solution of the salt is feebly alkaline to litmus paper, but it does not affect phenolphthalein.

An aqueous solution of the salt (1 in 10) yields, with an equal volume of acetic acid, a white, crystalline precipitate.

With silver nitrate T.S. it produces a white precipitate, which becomes black on boiling.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

When heated with potassium hydroxide T.S., the solution should not evolve *ammonia*.

If 1 Gm. of Potassium and Sodium Tartrate be thoroughly ignited at red heat, and the residue extracted with boiling distilled water, until the washings cease to react with methyl-orange T.S., the mixed filtrate and washings should require, for complete neutralization, not less than 14.1 Cc. of half-normal hydrochloric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.—8 Gm. (120 grains).

POTASSII FERROCYANIDUM

Potassium Ferrocyanide

$K_4Fe(CN)_6 + 3H_2O = 419.62$

It should contain not less than 99 percent. of pure Potassium Ferrocyanide, and should be kept in well-stoppered bottles.

Large, soft, transparent, yellow, four-sided, monoclinic tabular crystals or prisms; odorless, and having a mild, saline taste. Slightly efflorescent on exposure to the air.

Soluble in about 4 parts of water at 25° C. (77° F.), and in 2 parts of boiling water; insoluble in alcohol.

When heated to 60° C. (140° F.), the salt begins to turn white from loss of water of crystallization, and when heated at 100° C. (212° F.), it is rendered anhydrous.

The aqueous solution is neutral to litmus paper.

With sodium bitartrate T.S. the concentrated aqueous solution yields a white, crystalline precipitate.

The color of the precipitate produced by the addition of ferric chloride T.S. to the diluted aqueous solution of the salt is dark blue; that produced by copper sulphate T.S. is reddish-brown; lead acetate T.S. or silver nitrate T.S. causes a white precipitate.

No effervescence should be caused by the addition of diluted sulphuric acid to a concentrated solution of the salt (absence of *carbonate*).

The precipitate produced by silver nitrate T.S. in the aqueous solution, acidulated with nitric acid, should be of a white color, without a tinge of red (absence of *ferricyanide*).

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

POTASSII HYDROXIDUM

Potassium Hydroxide

KOH = 55.74

[POTASSA, PHARM. 1890]

It should contain not less than 85 percent. of pure anhydrous Potassium Hydroxide, and not more than 2 percent. of other inorganic substances, with the exception of water. It should be kept in well-stoppered bottles made of hard glass.

Dry, white or nearly white flakes, fused masses, or in pencils, hard and brittle, showing a crystalline fracture; odorless, or having a faint odor of lye, and of a very acrid and caustic taste. *Great caution is necessary in tasting and handling it*, as it rapidly destroys organic tissues. Exposed to the air, it readily absorbs carbon dioxide and moisture, and deliquesces.

Soluble in about 0.4 part of water at 25° C. (77° F.), and in 2 parts of alcohol; very soluble in boiling water, and in boiling alcohol; slightly soluble in ether.

When heated to about 530° C. (986° F.), Potassium Hydroxide melts to a clear, oily liquid, and at a bright red heat is volatilized unchanged. When introduced into a non-luminous flame, it imparts to it a violet color.

A solution of Potassium Hydroxide, even when greatly diluted, gives an intensely alkaline reaction with red litmus paper.

The aqueous solution (1 in 20) should be perfectly clear and colorless.

A concentrated solution of Potassium Hydroxide, after acidulation with hydrochloric acid, yields a bright yellow precipitate with platinic chloride T.S.

A concentrated, aqueous solution (1 in 10), when added to an excess of tartaric acid T.S., produces a white, crystalline precipitate, which redissolves when the Potassium Hydroxide is added in excess.

An aqueous solution of Potassium Hydroxide (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

On adding an excess of diluted sulphuric acid to 10 Cc. of an aqueous solution of Potassium Hydroxide (1 in 10), no distinct effervescence should occur (limit of *carbonate*).

Introduce about 1 Gm. of Potassium Hydroxide into a stoppered weighing-bottle and weigh accurately. Dissolve this in about 50 Cc. of water and titrate the solution with normal sulphuric acid V.S., using methyl-orange T.S. as indicator. Multiply the number of Cc. of the normal sulphuric acid V.S. consumed, by 5.574, and divide this product by the weight of the Potassium Hydroxide taken; the quotient, which must be not less than 85, represents the percentage of Potassium Hydroxide present.

POTASSII HYPOPHOSPHIS

Potassium Hypophosphite

$KPH_2O_2 = 103.39$

It should contain not less than 98 percent. of pure Potassium Hypophosphite [$PO.H_2OK$], and should be kept in well-stoppered bottles. Caution should be observed in dispensing Potassium Hypophosphite, as explosion is liable to occur when it is triturated or heated with nitrates, chlorates, or other oxidizing agents.

White, opaque, hexagonal plates, or crystalline masses, or a granular powder; odorless, and having a pungent, saline taste; very deliquescent. Soluble in about 0.5 part of water, and in 7 parts of alcohol at 25° C. (77° F.); in 0.3 part of boiling water, and in 3.6 parts of boiling alcohol; insoluble in ether.

When heated in a dry test-tube, the salt at first loses moisture, and then evolves spontaneously inflammable hydrogen phosphide gas, which burns with a bright yellow flame.

The aqueous solution (1 in 20) is neutral or slightly alkaline to litmus paper, and yields, with sodium bitartrate T.S., a white, crystalline precipitate.

One Gm. of the dried salt, dissolved in about 10 Cc. of water, should not require more than 1.5 Cc. of tenth-normal hydrochloric acid V.S. for neutralization (methyl-orange T.S. being used as indicator).

The diluted aqueous solution, slightly acidulated with diluted sulphuric acid, yields, with silver nitrate T.S., a white precipitate, which rapidly turns brown or black, owing to the separation of metallic silver.

On gently heating an aqueous solution of Potassium Hypophosphite with copper sulphate T.S., a reddish-brown precipitate is formed.

When the aqueous solution of the salt (1 in 20), acidulated with hydrochloric acid, is added, drop by drop, to an excess of mercuric chloride T.S., a white precipitate of mercurous chloride is at first formed. On further addition of an excess of the Potassium Hypophosphite solution, the precipitate becomes gray from reduction to metallic mercury.

An aqueous solution of the salt (1 in 20) should not effervesce upon the addition of an acid (absence of *carbonate*).

An aqueous solution of the salt (1 in 20), acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 5 Cc. of an aqueous solution of Potassium Hypophosphite (1 in 10) be measured into a beaker containing 3 Cc. of nitric acid diluted with about 10 Cc. of water, and the mixture be evaporated to dryness on a water-bath, the residue should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.— 0.500 Gm. = 500 milligrammes (7½ grains).

POTASSII IODIDUM

Potassium Iodide

$KI = 164.76$

It should contain not less than 99 percent. of pure Potassium Iodide, and should be kept in well-stoppered bottles.

Colorless, transparent, translucent, or opaque white, cubical crystals, or a white, granular powder, having a peculiar, faint, iodine-like odor, and a pungent, saline, afterwards bitter taste. Permanent in dry air, and but slightly deliquescent in moist air.

Soluble in 0.7 part of water, and in about 12 parts of alcohol at 25° C. (77° F.); in 0.5 part of boiling water, and in 6 parts of boiling alcohol; also soluble in 2.5 parts of glycerin.

When heated, the salt decrepitates. At a low red heat it fuses, and at a bright red heat it is volatilized without decomposition.

Its aqueous solution is neutral, or has a slightly alkaline reaction upon litmus paper.

If 1 Gm. of the salt be dissolved in 10 Cc. of water, and 0.1 Cc. of tenth-normal sulphuric acid V.S. be added, no color should be produced by the subsequent addition of a drop of phenolphthalein T.S., even after heating (limit of *alkali*).

An aqueous solution of Potassium Iodide (1 in 20) yields a white, crystalline precipitate with sodium bitartrate T.S.

If to 5 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chlorine water be added, iodine will be liberated, and impart to the solution a light reddish-brown color. On agitating the mixture with a few drops of chloroform, the latter will acquire a violet color.

No residue should be left when 1 Gm. of the salt is dissolved in 2 Cc. of diluted alcohol of specific gravity 0.928 (absence of *less soluble salts*).

If to 0.5 Gm. of the salt, dissolved in 10 Cc. of distilled water, which has previously been boiled and cooled in a small flask, 2 drops of diluted sulphuric acid (free from sulphurous and nitrous acids) be added, no distinct yellow color should appear within half a minute (limit of *iodate*).

An aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If to 1 Gm. of Potassium Iodide contained in a test-tube of about 40 Cc. capacity, 5 Cc. of water, 5 Cc. of potassium hydroxide T.S., and about 0.2 Gm. of aluminum wire be added, and if, in the upper portion of the test-tube, a pledget of purified cotton be inserted, and over the mouth there be placed a piece of moistened red litmus paper, then, if the tube be heated upon a water-bath for fifteen minutes, no blue coloration of the paper should be discernible (limit of *nitrates* and *nitrites*).

Ten Cc. of the aqueous solution of the salt (1 in 20), when acidulated with hydrochloric acid, should not be rendered turbid by the addition of 1 Cc. of potassium sulphate T.S. (absence of *barium*).

If 5 Cc. of the aqueous solution be gently heated with one drop of ferrous sulphate T.S. and 0.5 Cc. of potassium hydroxide T.S., no blue color should appear after acidulating the mixture with hydrochloric acid (absence of *cyanide*).

If 0.2 Gm. of Potassium Iodide be dissolved in 2 Cc. of ammonia water (10 percent.), and 13 Cc. of tenth-normal silver nitrate V.S. be added, then, after thoroughly agitating and filtering, the filtrate, upon acidifying with nitric acid, should not become more than slightly turbid nor should any darkening appear within ten minutes (limit of *chlorides* and *bromides* and absence of *thiosulphate*).

If 0.5 Gm. of the well-dried salt be dissolved in 10 Cc. of distilled water, and about 3 drops of potassium chromate T.S. be added, it should require not more than 30.8 Cc. nor less than 30 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color (corresponding to at least 99 percent. of pure Potassium Iodide).

Average dose.—0.500 Gm. = 500 milligrammes ($7\frac{1}{2}$ grains).

POTASSII NITRAS

Potassium Nitrate

$KNO_3 = 100.43$

It should contain not less than 99 percent. of pure Potassium Nitrate [$NO_2.OK$], and should be kept in well-stoppered bottles.

Colorless, transparent, six-sided, rhombic prisms, or a white crystalline powder; odorless, and having a cooling, saline, and pungent taste. Slightly hygroscopic in moist air.

Soluble in 3.6 parts of water at 25° C. (77° F.), and in 0.4 part of boiling water; very sparingly soluble in alcohol.

When heated to 353° C. (667.4° F.) the salt melts. At a higher temperature it is decomposed, giving off oxygen at first, and then some of its nitrogen, leaving a residue of potassium nitrate, nitrite, and oxide. When thrown upon red-hot coals, the salt deflagrates.

The aqueous solution is neutral to litmus paper.

With sodium bitartrate T.S. the aqueous solution (1 in 20) yields a white, crystalline precipitate.

If 5 Cc. of an aqueous solution (1 in 20) be agitated with an equal volume of sulphuric acid, and the liquid be cooled and a crystal of ferrous sulphate be placed in the liquid, a dark brown color should appear around the crystal.

If a drop of diphenylamine T.S. be mixed with 5 Cc. of an aqueous solution, and sulphuric acid be slowly added so as to form a separate layer, a deep blue color will appear at the line of contact.

An aqueous solution of Potassium Nitrate (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform be added, and if chlorine water be introduced, drop by drop, with agitation, the chloroform should not acquire a violet tint (absence of *iodide*).

No yellow color should appear when 0.1 Gm. of the dry salt is sprinkled upon 1 Cc. of pure concentrated sulphuric acid (absence of *chlorate* and *perchlorate*).

Average dose.—0.500 Gm. = 500 milligrammes ($7\frac{1}{2}$ grains).

POTASSII PERMANGANAS

Potassium Permanganate

$KMnO_4 = 156.98$

It should contain not less than 99 percent. of pure Potassium Permanganate $[MnO_3.OK]$, and should be kept in glass-stoppered bottles, protected from light.

Potassium Permanganate, when in concentrated solution or in the dry condition, should not be brought in contact with organic or other readily oxidizable substances.

Slender, monoclinic prisms, of a dark purple color, almost opaque by transmitted light, and of a blue, metallic lustre by reflected light, odorless, and having a taste at first sweet, but afterwards disagreeable and astringent. Permanent in the air.

Soluble in about 15 parts of water at 25° C. (77° F.), and in 3 parts of boiling water; in contact with alcohol it is decomposed.

When heated, the salt decrepitates, and at 240° C. (464° F.) it decomposes, yielding oxygen, potassium manganate, and manganese dioxide.

The aqueous solution of the salt is of a deep violet-red color when concentrated, and of a rose color when much diluted, and the rose color is discharged by hydrogen sulphide, ferrous sulphate, oxalic acid, alcohol, hydrogen dioxide, and many other readily oxidizable substances, especially if the solution be first rendered acid by sulphuric acid.

An aqueous solution is neutral to litmus paper.

If 0.5 Gm. of Potassium Permanganate be boiled with 20 Cc. of water and

4 Cc. of alcohol until it is completely decomposed, and the liquid then filtered, the clear, colorless filtrate may be used for the following tests:

If to 5 Cc. of the filtrate, acidulated with nitric acid, barium chloride T.S. be added, not more than a very slight turbidity should be produced (limit of *sulphate*).

In another portion of 5 Cc., acidulated with nitric acid, silver nitrate T.S. should produce no precipitate or cloudiness (absence of *chloride*).

If to another portion of 5 Cc. of the filtrate 1 drop of diphenylamine T.S. be added, and then 1 Cc. of sulphuric acid introduced, so as to form a layer beneath, no blue color should appear at the line of contact (absence of *nitrate*).

If 0.1 Gm. of Potassium Permanganate be dissolved in 100 Cc. of distilled water, to which 1 Cc. of sulphuric acid and 35 Cc. of tenth-normal oxalic acid V.S. have been previously added, then the addition of not more than 3.5 Cc. of tenth-normal potassium permanganate V.S. should be required to impart a permanent pink tint.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

POTASSII SULPHAS

Potassium Sulphate

$K_2SO_4 = 173.07$

It should contain not less than 99 percent. of pure Potassium Sulphate [$SO_2(OK)_2$].

Hard, colorless, transparent, six-sided, rhombic prisms terminated by pyramids, or a white powder, odorless, and having a somewhat bitter, saline taste. Permanent in the air.

Soluble in about 9 parts of water at 25° C. (77° F.), and in 4 parts of boiling water; insoluble in alcohol.

When heated, the crystals decrepitate. At a bright red heat they fuse, and at a white heat the salt suffers partial decomposition.

The aqueous solution is neutral to litmus paper.

The saturated aqueous solution of the salt yields a white, crystalline precipitate with excess of sodium bitartrate T.S.

An aqueous solution of the salt (1 in 20) yields with barium chloride T.S. a heavy white precipitate, insoluble in hydrochloric acid.

The aqueous solution of Potassium Sulphate (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.— 2 Gm. (30 grains).

PRUNUM

Prune

The partly dried ripe fruit of *Prunus domestica* Linné (Fam. *Rosaceæ*).

Oblong, ellipsoidal, more or less compressed, 3 to 4 Cm. long; externally brownish-black, shrivelled; the sarcocarp sweet and acidulous; putamen hard, smooth or irregularly ridged; the seed, shaped like that of the almond but smaller, and of a bitter-almond taste.

PRUNUS VIRGINIANA

Wild Cherry

The bark of *Prunus serotina* Ehrhart (*Prunus virginiana* Miller) (Fam. *Rosaceæ*), which should be collected in autumn and carefully dried and preserved.

Usually in transversely curved pieces from 3 to 7 Cm. long, 0.5 to 4 Mm. thick; outer surface pale green to greenish-brown, smooth, with numerous lenticels; inner surface light brown, somewhat reticulately striate or fissured; fracture short, granular; having a bitter-almond-like odor when macerated in water; taste astringent, aromatic, and agreeably bitter.

Average dose.—2 Gm. (30 grains).

PULVIS ACETANILIDI COMPOSITUS

Compound Acetanilide Powder

Acetanilide, *seventy grammes*	70 Gm.
Caffeine, *ten grammes*	10 Gm.
Sodium Bicarbonate, *twenty grammes*	20 Gm.
To make *one hundred grammes*	100 Gm.

Reduce the ingredients separately to a fine powder and mix them thoroughly.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

PULVIS AROMATICUS

Aromatic Powder

Saigon Cinnamon, in No. 60 powder, *thirty-five grammes*	35 Gm.
Ginger, in No. 60 powder, *thirty-five grammes*	35 Gm.
Cardamom, deprived of pericarps and crushed, *fifteen grammes*	15 Gm.
Myristica, in No. 20 powder, *fifteen grammes*	15 Gm.
To make *one hundred grammes*	100 Gm.

Triturate the Cardamom and Myristica with a portion of the Saigon Cinnamon, until they are reduced to a fine powder; then add the remainder of the Saigon Cinnamon and the Ginger, and rub them together until they are thoroughly mixed.

Average dose.—1 Gm. (15 grains).

PULVIS CRETÆ COMPOSITUS

Compound Chalk Powder

Prepared Chalk, *thirty grammes*	30 Gm.
Acacia, in fine powder, *twenty grammes*	20 Gm.
Sugar, in fine powder, *fifty grammes*	50 Gm.
To make *one hundred grammes*	100 Gm.

Mix intimately.

Average dose.—2 Gm. (30 grains).

PULVIS EFFERVESCENS COMPOSITUS

Compound Effervescing Powder

Sodium Bicarbonate, dried and in fine powder, *thirty-one grammes*	31 Gm.
Potassium and Sodium Tartrate, dried and in fine powder, *ninety-three grammes*	93 Gm.
Tartaric Acid, dried and in fine powder, *twenty-seven grammes*	27 Gm.

Mix the Sodium Bicarbonate intimately with the Potassium and Sodium Tartrate, divide the mixture into *twelve equal parts,* and wrap each part in a separate blue paper.

Then divide the Tartaric Acid into *twelve equal parts,* and wrap each part in a separate white paper.

Keep the powders in well-closed containers, in a dry place.

Average dose.—1 set of two powders.

PULVIS GLYCYRRHIZÆ COMPOSITUS

Compound Powder of Glycyrrhiza

Senna, in No. 80 powder, *one hundred and eighty grammes*	180 Gm.
Glycyrrhiza, in No. 80 powder, *two hundred and thirty-six grammes*	236 Gm.
Washed Sulphur, *eighty grammes*	80 Gm.
Oil of Fennel, *four grammes*	4 Gm.
Sugar, in fine powder, *five hundred grammes*	500 Gm.
To make *one thousand grammes*	1000 Gm.

Mix the Oil of Fennel thoroughly with about one-half of the Sugar, then add the remainder of the Sugar and the other ingredients, and mix thoroughly. Finally, pass the powder through a No. 80 sieve, pulverize the residue if any should be left on the sieve, add to the sifted powder, and mix thoroughly. Keep it in well-closed vessels.

Average dose.—4 Gm. (60 grains).

PULVIS IPECACUANHÆ ET OPII

Powder of Ipecac and Opium

Ipecac, in No. 60 powder, *ten grammes*	10 Gm.
Powdered Opium, *ten grammes*	10 Gm.
Sugar of Milk, in No. 30 powder, *eighty grammes*	80 Gm.
To make *one hundred grammes*	100 Gm.

Triturate them together thoroughly and reduce to a very fine powder.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

PULVIS JALAPÆ COMPOSITUS

Compound Powder of Jalap

Jalap, in No. 60 powder, *thirty-five grammes*	35 Gm.
Potassium Bitartrate, in fine powder, *sixty-five grammes*	65 Gm.
To make *one hundred grammes*	100 Gm.

Rub them together until they are thoroughly mixed.

Average dose.—2 Gm. (30 grains).

PULVIS MORPHINÆ COMPOSITUS

Compound Powder of Morphine

Morphine Sulphate, *one and one-half grammes*	1.5 Gm.
Camphor, *thirty-two grammes*	32.0 Gm.
Glycyrrhiza, in No. 80 powder, *thirty-three grammes*	33.0 Gm.
Precipitated Calcium Carbonate, *thirty-three and one-half grammes*	33.5 Gm.
Alcohol, *a sufficient quantity*,	
To make *one hundred grammes*	100 Gm.

Rub the Morphine Sulphate with the Precipitated Calcium Carbonate, added in portions of about *five grammes* each, until it is thoroughly mixed, then rub the Camphor with a little Alcohol until it is reduced to a powder, and mix intimately with the Glycyrrhiza and the other powders. Finally, pass the powder through a No. 40 sieve, pulverize the residue if any should be left on the sieve, add to the sifted powder, and mix thoroughly. Transfer it to well-stoppered bottles.

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

PULVIS RHEI COMPOSITUS

Compound Powder of Rhubarb

Rhubarb, in No. 60 powder, *twenty-five grammes*	25 Gm.
Magnesium Oxide, *sixty-five grammes*	65 Gm.
Ginger, in No. 60 powder, *ten grammes*	10 Gm.
To make *one hundred grammes*	100 Gm.

Rub the Rhubarb and Ginger together, and finally the Magnesium Oxide, gradually added, until they are thoroughly mixed.

Average dose.—2 Gm. (30 grains).

PYRETHRUM

Pyrethrum

The root of *Anacyclus Pyrethrum* (Linné) De Candolle (Fam. *Compositæ*).

Somewhat fusiform, nearly simple, 5 to 10 Cm. long, 3 to 20 Mm. in diameter; externally dark brown or grayish-brown, longitudinally wrinkled and somewhat furrowed, crown somewhat annulate and sometimes tufted with coarse fibres or with soft woolly hairs; fracture short; bark dark brown, resinous, 0.5 to 1 Mm. thick, closely adhering to the light yellow, radiate, porous wood; odor distinct; taste pungent, very acrid, producing a prompt sialogogue effect.

Average dose.—2 Gm. (30 grains).

PYROGALLOL

Pyrogallol

$C_6H_6O_3 = 125.10$

A triatomic phenol [$C_6H_3(OH)_3$ 1:2:3], obtained chiefly by carefully heating gallic acid. Pyrogallol should be kept in dark amber-colored bottles.

Light, white laminæ or fine needles, odorless and having a bitter taste; acquiring a grayish tint on exposure to air and light.

Soluble in 1.6 parts of water, 1 part of alcohol, and in 1.1 parts of ether at 25° C. (77° F.); very soluble in boiling water, and in boiling alcohol.

When heated to 132° C. (269.6° F.) Pyrogallol melts and sublimes unchanged. When ignited it is consumed, leaving no residue.

The freshly prepared aqueous solution is neutral to litmus paper and colorless, but gradually acquires by exposure to the air a brown color and an acid reaction, due to absorption of oxygen; the absorption of oxygen and change of color take place very rapidly if the solution contains an alkali hydroxide.

The aqueous solution of Pyrogallol (1 in 10) reduces solutions of the salts of silver, gold, and mercury even in the cold.

When freshly prepared, 1 Cc. of the aqueous solution (1 in 20) is colored brownish-red by a few drops of ferric chloride T.S., and this color is changed to deep bluish-black on the addition of 1 or 2 drops of ammonia water. A bluish-black color is also produced in the aqueous solution of Pyrogallol by freshly prepared ferrous sulphate T.S.

PYROXYLINUM

Pyroxylin

A product obtained by the action of nitric and sulphuric acids on cotton, and consisting chiefly of cellulose tetranitrate [$C_{12}H_{16}(ONO_2)_4O_6$]. It should be kept in cartons, protected from the light.

A yellowish-white, matted mass of filaments, resembling raw cotton in appearance, harsh to the touch, exceedingly inflammable, burning, when unconfined, very rapidly with a luminous flame (less explosive than cellulose trinitrate).

Slowly but completely soluble in 25 parts of a mixture of 3 volumes of ether and 1 volume of alcohol. Soluble in acetone and in glacial acetic acid, and precipitated from these solutions on addition of water.

It should leave no weighable residue of mineral impurity when ignited.

When kept in well-closed bottles and exposed to the light, it is decomposed with the evolution of nitrous vapors, a carbonaceous mass being deposited.

QUASSIA

Quassia

The wood of *Picræna excelsa* (Swartz) Planchon (Fam. *Simarubaceæ*), known commercially as Jamaica Quassia, or of *Quassia amar* Linné (Fam. *Simarubaceæ*), known commercially as Surinam Quassia.

Jamaica Quassia.—*Occurring in various forms, usually in chips, raspings* or billets; yellowish-white or pale yellow, and of rather coarse texture; odor slight; taste intensely bitter; medullary rays containing tetragonal prisms or small, [illegible] crystals of calcium oxalate. Billets of Jamaica Quassia are usually 12.5 Cm. or more in diameter; in tangential section the medullary rays are mostly 3 to 5 rows of cells in width.

Surinam Quassia.—*Occurring* usually in billets not exceeding 7.5 Cm. in diameter; the wood is heavier, harder, and more deeply colored than that of Jamaica Quassia, and the medullary rays in tangential section are mostly 1 or 2 rows of cells in width.

Average dose.—0.5 Gm. (7½ grains).

QUERCUS

White Oak

[QUERCUS ALBA, PHARM. 1890]

The dried bark of Quercus alba Linné (Fam. Cupuliferæ), collected from trunks or branches ten to twenty-five years of age, and deprived of the periderm.

In nearly flat pieces, 2 to 10 Mm. thick; externally light brown, becoming darker with age, rough-fibrous; fracture uneven, coarsely fibrous; odor distinct; taste strongly astringent; not tingeing the saliva yellow when chewed.

Average dose.—1 Gm. (15 grains).

QUILLAJA

Quillaja

The dried bark of *Quillaja Saponaria* Molina (Fam. *Rosaceæ*), deprived of the periderm.

In flat pieces of variable length, 3 to 8 Mm. thick, or in small chips; outer surface brownish-white, often with small patches of cork attached, otherwise nearly smooth; inner surface yellowish-white, nearly smooth, with occasional circular depressions, conical projections or transverse channels; fracture uneven and strongly fibrous, the laminæ oblique to each other; odor slight; taste acrid.

The powder is strongly sternutatory, and contains calcium oxalate in monoclinic pyramids and prisms from 0.035 to 0.200 Mm. long.

QUININA

Quinine

$C_{20}H_{24}N_2O_2 + 3H_2O = 375.46$

An alkaloid obtained from the bark of various species of *Cinchona* (Fam. *Rubiaceæ*). Quinine should be kept in well-stoppered, amber-colored bottles.

A white, flaky or micro-crystalline powder, odorless, having a bitter taste, and slightly efflorescent in dry air. Quinine, when freshly crystallized, should contain three molecules of water of crystallization. When heated, it fuses at 57° C. (134.6° F.), and loses two molecules of water of crystallization at 100° C. (212° F.), and the third molecule at 125° C. (257° F.); at ordinary temperatures the loss is gradual.

Quinine free from water is soluble in 1750 parts of water, 0.6 part of alcohol, 4.5 parts of ether, 1.9 parts of chloroform, 158 parts of glycerin, 120 parts of benzene, 3450 parts of a solution of potassium hydroxide (1 in 20), and in 1810 parts of ammonia water at 25° C. (77° F.). It is soluble in 810 parts of water at 80° C. (176° F.).

Quinine containing three molecules of water is soluble in 1550 parts of water, 0.6 part of alcohol, 1.3 parts of ether, 1.6 parts of chloroform, 212 parts of glycerin, 166 parts of benzene, 3450 parts of a solution of potassium hydroxide (1 in 20), and in 1810 parts of ammonia water at 25° C. (77° F.). It is soluble in 775 parts of water at 80° C. (176° F.).

When rendered anhydrous by heating to constant weight at 125° C. (257° F.), its melting point is 174.9° C. (346.8° F.).

Its aqueous solution is lævogyrate, and is alkaline to moistened litmus paper.

If to 1 Cc. of an aqueous solution of quinine (1 in 100), containing just sufficient diluted sulphuric acid to effect complete solution, there be added 2 Cc. of bromine T.S., followed by 1 Cc. of ammonia water, the liquid should acquire an emerald-green color (*thalleioquin*).

If 0.7 Gm. of Quinine be dissolved in a mixture of 15 Cc. of acetic acid, 6 Cc. of alcohol, and 0.5 Cc. of sulphuric acid, the solution heated to boiling, and 7 Cc. of a saturated solution of iodine in alcohol be added slowly, bronze or olive-

[illegible] crystals of quinine iodo-sulphate will separate on gradually cooling [illegible] These crystals are insoluble in cold water.

[illegible] Gm. of Quinine be dissolved in 1 Cc. of diluted sulphuric acid, the [illegible] with distilled water to 20 Cc. and neutralized with ammonia [illegible] solution of hydrogen dioxide and 1 drop of copper sulphate [illegible] and the liquid boiled, an intensely red color should appear, [illegible] changes to a blue, and finally to a green color. (Quinine and quin[illegible] respond to this test.)

[illegible] Gm. of Quinine should dissolve completely in a slightly warmed mixt[illegible] absolute alcohol and 3 Cc. of ether, which solution should re[illegible] absence of *cinchonine* and *cinchonidine*).

[illegible] should not impart more than a faintly yellowish tint to sulph[illegible] *readily carbonizable organic impurities*), nor produce a red [illegible] difference from *morphine*).

[illegible] should not lose more than 14.3 percent. of water on heating to 125° C. [illegible] *absence of an excess of water*).

[illegible] heated with 2 Cc. of potassium hydroxide T.S., no ammonia should be [illegible] *absence of ammonium salts*).

[illegible] Gm. of Quinine, which has previously been dried at 50° C. (122° F. [illegible] in a porcelain dish, in 20 Cc. of alcohol. Add 2 drops of hema-[illegible] neutralize exactly with sulphuric acid, and evaporate to dryness on [illegible] Complete the test by following the directions given on page 375, [illegible] *Quininæ Sulphas* (Test for Other Cinchona Alkaloids, Section II.).

Average dose. 0.250 Gm. 250 milligrammes (4 grains).

QUININÆ BISULPHAS

Quinine Bisulphate

$C_{20}H_{24}N_2O_2.H_2SO_4 + 7H_2O = 544.33$

The acid sulphate $[SO_2(OH)_2.C_{20}H_{24}N_2O_2 + 7H_2O]$ of the alkaloid quinine. It should be kept in well-stoppered, dark amber-colored vials.

Colorless, transparent or whitish, orthorhombic crystals or small needles; odorless, and having a very bitter taste. It effloresces on exposure to the air, and turns yellow on exposure to the light.

Soluble in 8.5 parts of water, 18 parts of alcohol, 1770 parts of ether, 920 parts of chloroform, and in 18 parts of glycerin at 25° C. (77° F.); soluble in 0.68 part of water at 80° C. (176° F.), and in 0.5 part of alcohol at 60° C. (140° F.).

When heated, the salt softens at 60° C. (140° F.), becomes semi-fluid at 70° C. (158° F.), and melts at about 160° C. (320° F.), with decomposition. It loses all of its water of crystallization at 100° C. (212° F.). On ignition, the salt is slowly consumed, leaving no residue.

Its aqueous solution has a strongly acid reaction and shows a blue fluorescence.

Barium chloride T.S. produces a white precipitate, insoluble in hydrochloric acid.

If 1 Gm. of the salt be dried at 100° C. (212° F.) until it ceases to lose weight, the residue, cooled in a desiccator, should weigh not less than 0.77 Gm. (corresponding to 7 molecules or 23 percent. of water of crystallization).

If to 1 Cc. of an aqueous solution of Quinine Bisulphate (1 in 100) there be added 2 Cc. of bromine T.S., and then 1 Cc. of ammonia water, the liquid should acquire an emerald-green color (*thalleioquin*).

Sulphuric acid should produce not more than a faintly yellow tint (limit of *carbonizable organic impurities*).

Dissolve 2 Gm. of Quinine Bisulphate, which has been dried at 50° C. (122° F.) for two hours, in 20 Cc. of distilled water, carefully neutralize with diluted sodium hydroxide T.S., and evaporate the solution to dryness on a water-bath. Complete the test by following the directions given on page 378, under *Quininæ Sulphas* (Test for Other Cinchona Alkaloids, Section II.).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

QUININÆ HYDROBROMIDUM

Quinine Hydrobromide

$C_{20}H_{24}N_2O_2.HBr + H_2O = 420.06$

[QUININÆ HYDROBROMAS, PHARM. 1890]

The hydrobromide [$HBr.C_{20}H_{24}N_2O_2 + H_2O$] of the alkaloid quinine. It should be kept in well-stoppered, amber-colored vials.

White, light, silky needles; odorless, and having a very bitter taste. The salt effloresces on exposure to the air.

Soluble in 40 parts of water, 0.67 part of alcohol, 16 parts of ether, 8 parts of glycerin, and very soluble in chloroform at 25° C. (77° F.); soluble in 3 parts of water at 80° C. (176° F.).

When heated to 100° C. (212° F.) the salt loses its water of crystallization. At 152° C. (305.6° F.) it begins to fuse, forming a syrupy liquid at 200° C. (392° F.). On ignition it is slowly consumed, leaving no residue.

Its solutions are neutral, or slightly alkaline to litmus paper, and when acidulated with diluted sulphuric acid show a vivid blue fluorescence.

Ammonia water added to an aqueous solution of the salt produces a white precipitate, which is soluble in a large excess of the reagent.

On precipitating a saturated aqueous solution of the salt with sodium hydroxide T.S., filtering, supersaturating the filtrate with acetic acid, adding chloroform and a little chlorine water, and shaking, the chloroform will separate with a yellow color.

If 1 Gm. of the salt be dried at 100° C. (212° F.) until it ceases to lose weight, the residue should weigh not less than 0.957 Gm. (corresponding to 1 molecule, or 4.25 percent. of water of crystallization).

If to 1 Cc. of a solution of Quinine Hydrobromide (1 in 100) 2 Cc. of bromine T.S. be added, and then 1 Cc. of ammonia water, an emerald green color should be produced (*thalleioquin*).

Quinine Hydrobromide should not impart more than a faintly yellowish tint to concentrated sulphuric acid (limit of readily *carbonizable organic impurities*), nor produce a red color with nitric acid (difference from *morphine*).

Aqueous solutions of the salt should not be rendered more than faintly turbid by barium chloride T.S. (limit of *sulphate*).

If to 5 Cc. of a saturated aqueous solution of potassium ferricyanide 25 Cc. of water, 15 drops of ferric chloride T.S., and 5 Cc. of diluted hydrochloric acid be added, a clear brown solution should result. On adding to this 0.1 Gm. of Quinine Hydrobromide, shaking well, and allowing it to stand for five minutes, no blue color should be developed (difference from *morphine*).

Dissolve 3 Gm. of Quinine Hydrobromide, which has been dried at 50° C. (122° F.) for two hours, in 30 Cc. of hot distilled water in an evaporating dish, and add 1.5 Gm. of crystallized sodium sulphate gradually, with constant stirring, and evaporate the liquid on a water-bath to dryness. Complete the test by following the directions given on page 378, under *Quininæ Sulphas* (Test for Other Cinchona Alkaloids, Section II.), using 30 Cc. of distilled water for maceration instead of 20 Cc. as there directed.

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

QUININÆ HYDROCHLORIDUM

Quinine Hydrochloride

$C_{20}H_{24}N_2O_2.HCl + 2H_2O = 393.76$

[QUININÆ HYDROCHLORAS, PHARM. 1890]

The hydrochloride [$HCl.C_{20}H_{24}N_2O_2 + 2H_2O$] of the alkaloid quinine. It should be kept in well-stoppered, amber-colored vials.

White, silky, glistening needles; odorless, and having a very bitter taste. The salt effloresces when exposed to warm air.

Soluble in 18 parts of water, 0.6 part of alcohol, 240 parts of ether, 0.8 part of chloroform, and in 8 parts of glycerin at 25° C. (77° F.); soluble in 0.4 part of water at 80° C. (176° F.).

When heated to 120° C. (248° F.), the salt loses its water of crystallization. At about 156° C. (312.8° F.), it begins to melt, but is not fully melted until the temperature reaches 190° C. (374° F.). On ignition it is slowly consumed, leaving no residue.

Its aqueous solution is neutral or faintly alkaline to red litmus paper, and is not fluorescent except when greatly diluted, or when diluted sulphuric acid is added to it.

Silver nitrate T.S. produces in aqueous solutions of the salt a white precipitate, insoluble in nitric acid.

If 1 Gm. of the salt be dried at 100° C. (212° F.) until it ceases to lose weight, the residue should weigh 0.91 Gm. (corresponding to 2 molecules or 9.1 percent. of water of crystallization).

If to 1 Cc. of a solution of Quinine Hydrochloride (1 in 100) 2 Cc. of bromine T.S. be added, and then 1 Cc. of ammonia water, an emerald-green color should be produced (*thalleioquin*).

Sulphuric acid should produce no color (absence of *readily carbonizable organic impurities*).

Aqueous solutions of the salt should not be rendered more than faintly turbid by barium chloride T.S. (limit of *sulphate*).

If to 5 Cc. of a saturated solution of potassium ferricyanide 25 Cc. of water, 15 drops of ferric chloride T.S., and 5 Cc. of diluted hydrochloric acid be added, a clear brown solution should result. On adding to this 0.1 Gm. of Quinine Hydrochloride, shaking well, and allowing it to stand for five minutes, no blue color should be developed (difference from *morphine*).

Dissolve 3 Gm. of Quinine Hydrochloride, which has been dried at 50° C. (122° F.) for two hours, in 30 Cc. of hot distilled water in an evaporating dish, and add 1.5 Gm. of crystallized sodium sulphate gradually, with constant stirring, and evaporate the liquid on a water-bath to dryness. Complete the test by following the directions given on page 378, under *Quininæ Sulphas* (Test for Other Cinchona Alkaloids, Section II.), using 30 Cc. of distilled water for maceration instead of 20 Cc. as there directed.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

QUININÆ SALICYLAS

Quinine Salicylate

$2C_{20}H_{24}N_2O_2.C_7H_6O_3 + H_2O = 935.54$

The salicylate [$2C_6H_4(OH)COOH.C_{20}H_{24}N_2O_2 + H_2O$] of the alkaloid quinine. It should be kept in amber-colored, well-stoppered vials.

Colorless needles, permanent in the air, but on keeping readily assuming a pinkish color.

Soluble in 77 parts of water, 11 parts of alcohol, 110 parts of ether, 37 parts of chloroform, and in 16 parts of glycerin at 25° C. (77° F.); soluble in 35 parts of water at 80° C. (176° F.), and in 11 parts of alcohol at 60° C. (140° F.).

When heated, it begins to melt at 183° C. (361.4° F.), with decomposition, and at 187° C. (368.6° F.) is entirely melted to a red liquid. When ignited, it is slowly consumed, without leaving a residue.

Its aqueous solution is alkaline to red litmus paper, and has a bitter taste. When treated with diluted sulphuric acid, its aqueous solution develops a blue fluorescence.

Its aqueous solution, when treated with a drop of ferric chloride T.S., should give a violet color.

Sulphuric acid containing about one-fifth of its volume of solution of formaldehyde gives a pink color.

If to 10 Cc. of a dilute aqueous solution of Quinine Salicylate there be added 3 Cc. of bromine T.S. and then an excess of ammonia water, an emerald-green color should be produced (*thalleioquin*).

When heated at 100° C. (212° F.), to constant weight, it should lose not more than 2 percent. in weight (absence of *excessive moisture*).

Mix 2 Gm. of Quinine Salicylate with 10 Cc. of distilled water, in a separator, add a slight excess of ammonia water, and shake the liquid with three successive portions of 25, 20, and 10 Cc. of ether, collect the ether-solution in a porcelain dish and evaporate it to dryness on a water-bath, dissolve the residue in alcohol, add just sufficient sulphuric acid to render the liquid exactly neutral, and again evaporate to dryness. Complete the test by following the directions given on page 378, under *Quininæ Sulphas* (Test for Other Cinchona Alkaloids, Section II.).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

QUININÆ SULPHAS

Quinine Sulphate

$(C_{20}H_{24}N_2O_2)_2.H_2SO_4 + 7H_2O = 866.15$

The sulphate $[SO_2(OH)_2.(C_{20}H_{24}N_2O_2)_2 + 7H_2O]$ of the alkaloid quinine. It should be kept in well-stoppered bottles, preferably of an amber color, and in a dark place.

White, silky, light, flexible, glistening crystals, or hard, prismatic, monoclinic needles, making a very light and easily compressible mass, odorless, and having a persistent, very bitter taste. It effloresces rapidly when it is exposed to dry air, and then becomes lustreless; when exposed to light it acquires a brownish tint. Quinine Sulphate sometimes crystallizes with 8 molecules of water of crystallization (16.18 percent.).

Soluble in 720 parts of water, 86 parts of alcohol, 400 parts of chloroform, and in 36 parts of glycerin at 25° C. (77° F.); very difficultly soluble in ether; soluble in 45 parts of water at 80° C. (176° F.), and in 9 parts of alcohol at 60° C. (140° F.). Diluted acids increase its solubility in water, and it is easily soluble in a mixture of chloroform 2 parts, and absolute alcohol 1 part.

Quinine Sulphate which has been dried over sulphuric acid melts at 205° C. (401° F.). When heated to 60° C. (140° F.), or when exposed to dry air, it loses all but 2 molecules of its water of crystallization, and upon heating it to 115° C. (239° F.), the remainder is expelled. Upon ignition, the salt is slowly consumed, without leaving a residue.

Its aqueous solution is neutral to litmus paper, and when acidulated with diluted sulphuric acid, develops a vivid blue fluorescence.

Barium chloride T.S. produces a white precipitate, insoluble in hydrochloric acid.

On treating [illegible] with 3 drops of [illegible] then with an excess of ammonia water the liquid should acquire an emerald-green color [illegible]. With proper adjustment of the reagents [illegible] will give a [illegible] green [illegible].

[illegible] of the salt should [illegible] when heated [illegible] in 7 Cc. of a mixture of 2 volumes of [illegible] and 1 volume of absolute alcohol, and the solution should remain clear on cooling (absence of *ammonium sulphate and inorganic salts*).

Sulphuric acid should impart to the salt not more than a faint yellowish tint [illegible].

Nitric acid should not produce a red color [illegible] from *morphine*.

[illegible] of the salt be dried at a temperature of [illegible] until a constant weight [illegible] the residue should weigh not less than [illegible] Gm. [illegible] not more than [illegible] of water.

Test for Other Cinchona Alkaloids.—[illegible] Quinine Sulphate at 50° C. (122° F.) for two hours.

[illegible] of this Dry Quinine Sulphate, which should be neutral or slightly alkaline to test paper, be [illegible] with [illegible] Cc. of water at [illegible] and [illegible] at [illegible] and be macerated at this temperature for [illegible] with occasional shaking [illegible] the liquid filtered through filter paper [illegible] then [illegible] Cc. of the filtrate be transferred to a test-tube and gently mixed, without shaking, with [illegible] of ammonia water which must be of [illegible] strength, have a temperature of [illegible] and be all added at once, a clear liquid should be produced.

If the temperature during the maceration has been [illegible] of ammonia water may be added [illegible] may be added [illegible].

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

RESINA

Resin

The residue left after distilling off the volatile oil from turpentine.

[illegible] in sharp, angular fragments, transparent, amber-colored, usually covered with a [illegible] at ordinary temperatures [illegible] fracture [illegible].

The specific gravity of Resin [illegible] and burns with a dense yellowish [illegible] in alcohol [illegible] and in [illegible] not less than 150. See Appendix, Test No. [illegible].

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

RESINA JALAPÆ

Resin of Jalap

Jalap, in No. 60 *powder*, *one thousand grammes* . . . . 1000 Gm.
Alcohol,
Water, *each a sufficient quantity*.

Moisten the *powder* with *three hundred cubic centimeters* of Alcohol, *and pack* it firmly in a cylindrical percolator; then add enough

Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding Alcohol, until *twenty-five hundred cubic centimeters* of percolate are obtained, or until the percolate ceases to produce more than a slight turbidity when dropped into water. Distil off the Alcohol, by means of a water-bath, until the percolate is reduced in weight to *two hundred and fifty grammes*, and add the latter slowly, with constant stirring, to *three thousand cubic centimeters* of water. When the precipitate has subsided, decant the supernatant liquid, and wash the precipitate twice, by decantation, with fresh portions of hot water. After having drained off all the liquid, transfer the Resin to a porcelain dish and heat it to dryness on a water-bath.

Yellow to brown masses or fragments, breaking with a resinous, glossy fracture, translucent at the edges, or a yellowish-gray to yellowish-brown powder, having a slight, peculiar odor, and a somewhat acrid taste. Permanent in the air. Soluble in alcohol in all proportions; insoluble in carbon disulphide, benzene, and fixed or volatile oils. Its alcoholic solution has a faintly acid reaction to blue litmus paper. Not more than 15 percent. of Resin of Jalap should be soluble in ether, and not more than 35 percent. in chloroform.

Slowly but completely soluble in 5 times its weight of ammonia water; when this solution is acidified with hydrochloric acid, only a slight turbidity should appear (absence of *rosin*, *guaiac*, and *other resins*).

Resin of Jalap should not suffer any material loss of weight when heated at 100° C. (212° F.) (absence of *water*). Anhydrous Resin of Jalap melts at about 150° C. (302° F.).

Water triturated with Resin of Jalap should neither become colored nor dissolve any portion of it (absence of *soluble impurities*).

No greenish-blue color should be produced on adding a few drops of ferric chloride T.S. to some of the powder moistened with alcohol (absence of *guaiac*).

One Gm. of Resin of Jalap when dissolved in 50 Cc. of alcohol containing 1 Cc. of phenolphthalein T.S. should require not more than 0.5 Cc. of half-normal alcoholic potassium hydroxide V.S. to produce a red color (limit of *acid resins*).

If to 1 Gm. of Resin of Jalap, dissolved in 50 Cc. of alcohol in a flask, 25 Cc. of half-normal alcoholic potassium hydroxide V.S. be added, and the mixture be heated on a water-bath for one hour, and if the excess of alkali be titrated with half-normal sulphuric acid V.S., using 5 drops of phenolphthalein T.S. as indicator, at least 20 Cc. of half-normal sulphuric acid V.S. should be required (limit of *saponifiable substances*).

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

RESINA PODOPHYLLI

Resin of Podophyllum

Podophyllum, in No. 60 powder, *one thousand grammes* . . .	1000 Gm.
Hydrochloric Acid, *ten cubic centimeters*	10 Cc.
Alcohol,	
Water, each, *a sufficient quantity*.	

Moisten the powder with *four hundred and eighty cubic centimeters* of Alcohol, and pack it firmly in a cylindrical percolator; then add enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding Alcohol until *sixteen hundred cubic centimeters* of percolate are obtained, or until the percolate ceases to produce more than a slight turbidity when dropped into water. Distil off the Alcohol by means of a water-bath, until the percolate is reduced to the consistence of a thin syrup, and pour it slowly, with constant stirring, into *one thousand cubic centimeters* of water, previously cooled to a temperature below 10° C. (50° F.), and mixed with the Hydrochloric Acid. When the precipitate has subsided, decant the supernatant liquid, and wash the precipitate twice, by decantation, with fresh portions of cold Water. Spread it in a thin layer, upon a strainer, and dry the Resin by exposure to the air, in a cool place, protected from the light. Should it coalesce during the drying, or aggregate into lumps having a varnish-like surface, it should be removed, broken in pieces, and rubbed in a mortar.

It should be kept in amber-colored, well-stoppered vials.

An amorphous powder, varying in color from grayish-white to pale greenish-yellow, turning darker when subjected to a heat exceeding 35° C. (95° F.) or when exposed to light. It has a slight, peculiar odor and a faintly bitter taste; very irritating to the mucous membrane, especially to that of the eyes.

Soluble in alcohol in all proportions; not less than 75 percent of Resin of Podophyllum should be soluble in ether, not less than 65 percent in chloroform, and not more than 25 percent in boiling water. A hot aqueous solution deposits most of its contents on cooling, and if the cooled liquid be filtered, the filtrate has a bitter taste, and turns brown upon the addition of a few drops of ferric chloride T.S. Soluble in potassium or sodium hydroxide T.S., forming a deep yellow liquid, which gradually becomes darker on standing, and from which the Resin is reprecipitated by acids.

Not less than 99 percent of Resin of Podophyllum should be soluble in alcohol; the solution should be clear or, at most, slightly opalescent, and should have a faintly acid reaction.

Upon incineration, Resin of Podophyllum should yield not more than 1 percent of ash.

Average dose.— { **Purgative, 0.015 Gm. = 15 milligrammes (1/4 grain).**
{ **Laxative, 0.005 Gm. = 5 milligrammes (1/12 grain).**

RESINA SCAMMONII

Resin of Scammony

Scammony, in No. 60 powder, *one thousand grammes* . . . . **1000 Gm.**
Alcohol,
Water, each, *a sufficient quantity.*

Digest the Scammony with successive portions of boiling Alcohol until it is exhausted. Mix the liquids, filter, and reduce the mixture to a syrupy consistence by distilling off the Alcohol. Then add the residue in a thin stream, with active stirring, to *twenty-five hundred cubic centimeters* of Water, separate the precipitate formed, wash it thoroughly with Water, and dry it at a gentle heat.

Yellowish-brown or brownish-yellow masses or fragments, breaking with a glossy resinous fracture, translucent at the edges; or a yellowish-white or grayish-white powder, having a faint, characteristic odor, and a slight, peculiar taste.

Soluble in alcohol in all proportions, completely soluble in oil of turpentine, and almost completely soluble in ether and chloroform. Ammonia water and solutions of alkalies dissolve it with the aid of a gentle heat, and from these solutions the Resin is not reprecipitated by acids.

When incinerated, Resin of Scammony should not yield more than 1 per cent. of ash.

Average dose.—0.200 Gm. = 200 milligrammes (3 grains).

RESORCINOL

Resorcinol

$C_6H_6O_2 = 109.22$

[RESORCINUM, PHARM. 1890]

A diatomic phenol [metadihydroxybenzene, $C_6H_4(OH)_2$ 1:3] obtained usually by the reaction of fused sodium hydroxide upon sodium metabenzenedisulphonate. Resorcinol should be kept in dark amber-colored vials.

Colorless, needle-shaped crystals, having a faint, peculiar odor and a sweetish, followed by a bitter, taste. It acquires a pinkish tint on exposure to light and air.

Soluble in 0.5 part of water at 25° C. (77° F.), slightly more soluble in alcohol; very soluble in boiling water or in boiling alcohol; also readily soluble in ether and glycerin; very slightly soluble in chloroform, carbon disulphide, and benzene.

When heated from 109° to 111° C. (228.2° to 231.8° F.) it melts and at a higher temperature is completely volatilized. It boils at 276.5° C. (529.7° F.) and is slightly volatile in a current of steam.

Its aqueous solution is neutral or only slightly acid to litmus paper.

On adding a few drops of ferric chloride T.S. to 10 Cc. of an aqueous solution of Resorcinol (1 in 200), the liquid assumes a bluish-violet color, changing to brownish-yellow on the addition of ammonia water (distinction from *catechol* and *quinol*).

Lead acetate T.S. should produce no precipitate when added to an aqueous solution of Resorcinol (distinction from, and absence of, *catechol*).

If 0.1 Gm. of Resorcinol be dissolved in 1 Cc. of potassium hydroxide T.S. and a drop of chloroform added, the mixture upon being heated will assume an intense crimson color. If a slight excess of hydrochloric acid be then added, the color will change to a pale straw-yellow.

On cautiously heating 0.05 Gm. of Resorcinol with 0.1 Gm. of tartaric acid and 10 drops of concentrated sulphuric acid, a thick carmine-red liquid will be formed, becoming pale yellow when diluted with water.

A concentrated aqueous solution of Resorcinol (1 in 2) should be colorless (absence of *empyreumatic bodies*), and when gently heated should not emit the odor of *phenol*.

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

RHAMNUS PURSHIANA

Cascara Sagrada

The dried bark of *Rhamnus Purshiana* De Candolle (Fam. *Rhamnaceæ*), collected at least one year before being used.

In quills or curved pieces, of variable length and 1 to 5 Mm. thick; outer surface reddish-brown, frequently more or less covered with grayish or whitish lichens, several of which are peculiar to this bark, and with small groups of their brownish fruit-heads; inner surface yellowish to light brownish, becoming dark brown with age and reddened by alkalies, longitudinally striate; fracture short, with projections of bast fibres in the inner bark, and the medullary rays forming converging groups; odor distinct; taste bitter and slightly acrid.

Average dose.—1 Gm. (15 grains).

RHEUM

Rhubarb

The dried rhizome of *Rheum officinale* Baillon, *Rheum palmatum* Linné, and the var. *tanguticum* Maximowicz (Fam. *Polygonaceæ*), or probably other species of *Rheum*, grown in China and Thibet, and deprived of most of the bark and carefully dried.

Subcylindrical, barrel-shaped, conical, plano-convex or irregularly formed pieces, frequently with a large perforation; hard and moderately heavy; 5 to 15 Cm. long, 4 to 8 Cm. in diameter; externally mottled with alternating striæ of light brown parenchyma cells and dark brown medullary rays, occasionally with reddish-brown cork patches and small, radiate scars of fibrovascular tissue, smooth and sometimes covered with a bright brownish-yellow powder; fracture somewhat granular, presenting a peculiar marbled appearance; odor characteristic; taste bitter, astringent; gritty when chewed.

Powder bright orange-yellow, becoming red with alkalies, containing rosette-shaped crystals of calcium oxalate which are from 0.050 to 0.100 Mm. in diameter, and spherical starch grains from 0.005 to 0.020 Mm. in diameter, either single or 2- to 4-compound.

Average dose.—1 Gm. (15 grains).

RHUS GLABRA

Rhus Glabra

The dried fruit of *Rhus glabra* Linné (Fam. *Anacardiaceæ*).

Flattened-ovoid, 3 to 4 Mm. in diameter, externally deep crimson, glandular-tomentose; endocarp light yellow, smooth, shiny, enclosing a single seed; inodorous; taste acidulous and astringent.

Average dose.— 1 Gm. (15 grains).

ROSA GALLICA

Red Rose

The dried petals of *Rosa gallica* Linné (Fam. *Rosaceæ*), collected before expanding.

Usually in small cones, consisting of numerous imbricated, roundish, retuse, deep purplish-red, yellow-clawed petals, having a characteristic odor and a bitterish, slightly acidulous, and distinctly astringent taste.

RUBUS

Rubus

The dried bark of the rhizome of *Rubus villosus* Aiton, *Rubus nigrobaccus* Bailey, or of *Rubus cuneifolius* Pursh (Fam. *Rosaceæ*).

In elongated, tough, flexible quills, from 3 to 6 Mm. in diameter, or in similar bands, the bark 1 to 2 Mm. thick; outer surface deep red-brown or dark gray-brown, occasionally blackish-brown, smoothish or somewhat scaly; inner surface yellow or pale brownish, strongly and coarsely long straight-striate; fracture tough-fibrous; readily splitting; inodorous; taste strongly astringent and bitterish.

Average dose.— 1 Gm. (15 grains).

SABAL

Sabal

The partially dried ripe fruit of *Serenoa serrulata* (Roemer and Shultes) Hooker filius (Fam. *Palmæ*).

Irregularly spherical to oblong-ovoid; 10 to 25 Mm. long, 10 to 15 Mm. in diameter; externally blackish-brown, shrivelled, somewhat oily; epicarp thin; sarcocarp about 1 Mm. thick, greenish-yellow, soft-spongy; endocarp thin, friable; seed hard, chocolate-brown; odor aromatic; taste sweetish, acrid, and oily.

Average dose.—1 Gm. (15 grains).

SABINA

Savin

The tops of *Juniperus Sabina* Linné (Fam. *Coniferæ*).

Short, thin, subquadrangular branchlets bearing leaves which are rather dark green, in four rows, opposite, scale-like, ovate-lanceolate, more or less acute, appressed, imbricated, having on the back a shallow groove containing an oblong or roundish gland; odor peculiar, terebinthinate; taste disagreeable, resinous and bitter.

Average dose.— 0.5 Gm. (7½ grains).

SACCHARUM

Sugar

$C_{12}H_{22}O_{11} = 339.6$

The refined sugar obtained from *Saccharum officinarum* Linné, and from various species or varieties of *Sorghum* (Fam. *Gramineæ*); also from one or more varieties of *Beta vulgaris* Linné (Fam. *Chenopodiaceæ*).

White, dry, hard, distinctly crystalline granules, odorless, and having a purely sweet taste. Permanent in the air.

The aqueous solution, saturated at 25° C. (77° F.), has a specific gravity of about 1.340, is miscible with water in all proportions, should be colorless, and is dextrogyrate.

Soluble in 0.46 part of water, and in 137.2 parts of alcohol at 25° C. (77° F.); in 0.2 part of boiling water, and in 28 parts of boiling alcohol; also soluble in 80 parts of boiling absolute alcohol, but insoluble in ether, chloroform, or carbon disulphide.

The aqueous or alcoholic solution of Sugar is neutral to litmus paper.

Both the aqueous and the alcoholic solution of Sugar should be clear and transparent. When kept in large, well-closed and completely filled bottles, the solutions should not deposit a sediment on prolonged standing (absence of *insoluble salts, ultramarine, Prussian blue*, etc.).

If 1 Gm. of Sugar be dissolved in 10 Cc. of boiling water, the solution mixed with 4 or 5 drops of silver nitrate T.S., then about 2 Cc. of ammonia water added, and the liquid quickly brought to the boiling point, not more than a slight coloration, and no black precipitate, should appear in the liquid after standing at rest for five minutes (absence of *glucose*, and of more than a slight amount of *inverted sugar*).

SACCHARUM LACTIS

Sugar of Milk

$C_{12}H_{22}O_{11} + H_2O = 357.48$

A peculiar crystalline sugar obtained from the whey of cows' milk by evaporation, and purified by recrystallization.

White, hard, crystalline masses, or a white powder feeling gritty on the tongue, odorless, and having a faintly sweet taste. Permanent in the air. On incinerating a portion, the percentage of ash remaining should not exceed 0.25 percent.

Soluble in 4.79 parts of water at 25° C. (77° F.), and in 1 part of boiling water; insoluble in absolute alcohol, ether, or chloroform.

An aqueous solution of Sugar of Milk is neutral to litmus paper, and is dextrogyrate.

On adding to 5 Cc. of a hot, saturated aqueous solution of Sugar of Milk an equal volume of sodium hydroxide T.S., and gently warming, the liquid will turn yellow and finally brownish-red. On the further addition of a few drops of cupric sulphate T.S., a brick-red precipitate will appear.

If 1 Gm. of Sugar of Milk be digested for half an hour with 10 Cc. of diluted alcohol, with occasional shaking, and the liquid filtered, the filtrate should remain clear after admixture with an equal volume of absolute alcohol, and this liquid, if evaporated on a water-bath, should leave not more than 0.03 Gm. of residue (absence of *cane sugar*).

An aqueous solution of Sugar of Milk (1 in 20) mixed with a few drops of hydrochloric acid should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of powdered Sugar of Milk be boiled for five minutes with 50 Cc. of distilled water and the solution cooled, no blue coloration should be produced upon the addition of one drop of iodine T.S. (absence of *starch*).

SAFROLUM

Safrol

$C_{10}H_{10}O_2 = 160.86$

The methylene ether of allyl pyrocatechol [$C_6H_3.C_3H_5.(OOCH_2)$ 1:3:4], found in oil of sassafras, camphor oil, and other volatile oils, purified, if necessary, by repeated chilling and crystallization.

A colorless or faintly yellow liquid with a sassafras-like odor.

Specific gravity: 1.098 to 1.100 at 25° C. (77° F.).

Boiling point: about 233° C. (451.4° F.).

It is optically inactive. On cooling to —20° C. (—4° F.) or below, it solidifies to a mass of crystals, which do not melt below 11° C. (51.8° F.).

Soluble in about an equal volume of strong alcohol, and in about 30 parts of 70 percent. alcohol. Miscible in all proportions with ether and chloroform.

Average dose.— 0.3 Cc. (5 minims).

SALICINUM

Salicin

$C_{13}H_{18}O_7 = 283.99$

A glucoside obtained from several species of *Salix* and *Populus* (Fam. *Salicaceæ*). Salicin should be kept in well-stoppered bottles.

Colorless, silky, shining, crystalline needles, rhombic prisms, or a white crystalline powder; odorless, and having a very bitter taste.

Soluble in 21 parts of water, and in 71 parts of alcohol at 25° C. (77° F.), in 3.3 parts of water at 80° C. (176° F.), and in 22 parts of alcohol at 60° C. (140° F.); insoluble in ether and chloroform.

It melts at 201.4° C. (394.5° F.). Upon ignition, it is consumed, leaving no residue.

Its aqueous solution is lævogyrate and neutral to litmus paper.

On heating a small portion of Salicin in a test-tube until it turns brown, then adding a few Cc. of water, and afterwards a drop of ferric chloride T.S., a violet color will be produced.

Sulphuric acid produces a red color, which disappears upon the addition of water.

Upon gently heating 0.1 Gm. of Salicin with 0.2 Gm. of potassium dichromate and 2 Cc. of diluted sulphuric acid, the odor of salicylic aldehyde will be developed.

Sulphuric acid containing a trace of molybdic acid produces with Salicin a violet color, changing to a deep brownish-red. Sulphuric acid containing a trace of potassium iodate produces a dark red color, changing to deep purple. Sulphuric acid containing about one-fifth of its volume of solution of formaldehyde produces a deep purplish-red color.

If to a small quantity of Salicin a few drops of nitric acid be added, the liquid evaporated to dryness, and the resulting yellowish residue treated with ammonia water and heated upon a water-bath with a fragment of potassium cyanide, a blood-red color will be developed.

The aqueous solution of Salicin is not precipitated by tannic or picric acid T.S., nor by mercuric potassium iodide T.S. (absence of, and difference from, *alkaloids*).

Average dose.— 1 Gm. (15 grains).

SALVIA

Salvia

The dried leaves of *Salvia officinalis* Linné (Fam. *Labiatæ*).

Long and stoutly petiolate, the blade elliptical or ovate-oblong, 3 to 7 Cm. long, obtuse or subacute at the summit, rounded or subcordate at the base, finely crenulate, thick, grayish-green, very pubescent, especially on the under surface, conspicuously reticulate-veined; odor aromatic; taste aromatic, bitter, and somewhat astringent.

Average dose.— 2 Gm. (30 grains).

SANGUINARIA

Sanguinaria

The dried rhizome of *Sanguinaria canadensis* Linné (Fam. *Papaveraceæ*), collected after the death of the foliage.

Of horizontal growth, cylindrical, often somewhat branched, 2 to 7 Cm. long, 5 to 15 Mm. in diameter; externally reddish-brown, slightly annulate; fracture short and somewhat waxy, brownish-red, or yellowish-white with numerous reddish resin cells; odor slight, the powder sternutatory; taste persistently acrid and bitter.

Average dose.— 0.125 Gm. (2 grains).

SANTALUM RUBRUM

Red Saunders

The heart-wood of *Pterocarpus santalinus* Linné filius (Fam. *Leguminosæ*).

Usually in chips, or a coarse, brownish-red powder; in transverse section slightly radiate, with numerous concentric rings, the medullary rays being 1 cell in width; nearly inodorous and almost tasteless.

Red Saunders imparts a red color to alcohol, but not to water.

SANTONICA

Santonica

The dried unexpanded flower-heads of *Artemisia pauciflora* (Ledebour) Weber (Fam. *Compositæ*).

Heads 2 to 4 Mm. long, oblong-ovoid, slightly flattened, obtuse, consisting of an involucre of about 12 to 18 closely imbricated, glandular scales with broad midribs, enclosing 4 or 5 rudimentary florets. Santonica has the appearance of a granular, yellowish-green or greenish-brown, somewhat glossy powder; odor strong, peculiar, somewhat camphoraceous; taste aromatic and bitter.

SANTONINUM

Santonin

$C_{15}H_{18}O_3 = 244.29$

The inner anhydride or lactone of santonic acid, obtained from Santonica. It should be kept in dark amber-colored vials and in a dark place.

Colorless, shining, flattened rhombic prisms; odorless, and nearly tasteless when first put into the mouth, but afterwards developing a bitter taste; permanent in the air, but turning yellow on exposure to light. It sublimes without decomposition, and is soluble in alkalies and in most volatile and fatty oils. Santonin which has become yellow may be converted into white crystals by recrystallization from alcohol.

Soluble in 5300 parts of water, 34 parts of alcohol, 78 parts of ether, and in 2.5 parts of chloroform at 25° C. (77° F.); soluble in 800 parts of water at 80° C. (176° F.), and in 5 parts of alcohol at 60° C. (140° F.).

It melts at 170.3° C. (338.5° F.). When ignited, it is consumed, leaving no residue.

Its solutions are lævogyrate and neutral to litmus paper.

If 0.5 Gm. of Santonin be heated with 5 Cc. of alcoholic potassium hydroxide T.S., a red color will be developed.

Upon shaking 0.01 Gm. of Santonin with a cold mixture of 1 Cc. each of sulphuric acid and water, heating to 100° C. (212° F.), and adding a minute trace of very dilute solution of ferric chloride, a violet color will result.

Sulphuric acid added to Santonin should not produce more than a faintly yellow color (absence of *sugar* and *other readily carbonizable organic impurities*).

If 2 Gm. of Santonin be boiled with 80 Cc. of water and 5 Cc. of diluted sulphuric acid, and the liquid, after frequent shaking, be allowed to become cold and then filtered, mercuric potassium iodide T.S., or iodine T.S., should produce no cloudiness in 10 Cc. of the filtrate, mixed with 10 Cc. of distilled water, even after standing for three hours (absence of *alkaloids*).

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

SAPO

Soap

Soap prepared from sodium hydroxide and olive oil.

A white or whitish solid, hard, yet easily cut when fresh, having a faint, peculiar odor free from rancidity, a disagreeable, alkaline taste, and an alkaline reaction.

Soluble in water and in alcohol, more readily with the aid of heat.

On placing 0.5 Gm. of Soap, together with about 10 Cc. of alcohol, in a tared beaker containing 1 Gm. of dry, clean sand, evaporating the resulting solution of the Soap to dryness, and drying the residue at 110° C. (230° F.), to a constant weight, the loss should not exceed 36 percent. (absence of an undue amount of *water*).

An alcoholic solution of Soap (1 in 25) should not gelatinize on cooling (absence of *animal fats*).

An aqueous solution of Soap (1 in 20) should remain unchanged in color upon the addition of ammonium sulphide T.S.; and upon acidulating another portion of the solution with hydrochloric acid and filtering, the filtrate should remain unchanged in color when an equal volume of hydrogen sulphide T.S. is added and the mixture is allowed to stand well stoppered in a warm place for half an hour (absence of *metallic impurities*).

On dissolving 20 Gm. of Soap in alcohol, with the aid of heat, transferring the undissolved residue, if any, to a tared filter, and washing it thoroughly with boiling alcohol, it should, after drying, weigh not more than 0.8 Gm. (limit of *sodium carbonate*, etc.); of this residue not more than 0.2 Gm. should be insoluble in water (limit of *silica* and other *accidental impurities*).

If a solution of 5 Gm. of Soap in 50 Cc. of hot water be mixed with 3 Cc. of tenth-normal oxalic acid V.S., the subsequent addition of a few drops of phenolphthalein T.S. should produce no pink or red tint (limit of *alkalinity*).

SAPO MOLLIS

Soft Soap

Linseed Oil, *four hundred grammes*	400 Gm.
Potassium Hydroxide, *ninety-five grammes*	95 Gm.
Alcohol, *forty cubic centimeters*	40 Cc.
Water, *a sufficient quantity.*	

Heat the Linseed Oil in a deep, capacious vessel, on a water-bath or steam-bath, to a temperature of about 70° C. (158° F.). Dissolve the Potassium Hydroxide in *four hundred and fifty cubic centimeters* of Water, warm the solution to about 70° C. (158° F.), add it to the Linseed Oil, and mix thoroughly; then incorporate the Alcohol and continue the heat (without stirring) until a small portion of the mixture is found to be soluble in boiling Water without the separation of oily drops. Then allow the mixture to cool, and transfer it to suitable vessels.

The Potassium Hydroxide used in this process should be of the full strength directed by the Pharmacopœia (85 percent.). Potassium Hydroxide of any other strength, however, may be used, if a proportionately larger or smaller quantity be taken, the proper amount for the above formula being ascertained by dividing 8075 by the percentage of absolute Potassium Hydroxide contained therein.

A soft, unctuous, yellowish-brown mass, having a characteristic odor and an alkaline taste.

An aqueous solution shows an alkaline reaction to red litmus paper.

If to a solution of 5 Gm. of Soft Soap in 50 Cc. of water, 2 drops of phenolphthalein T.S. be added, not less than 2.3 Cc. nor more than 4.5 Cc. of tenth-normal oxalic acid V.S. should be required to discharge the red tint (limit of *free alkali*).

Soluble in hot water to a nearly clear liquid; also in hot alcohol without leaving more than 3 percent. of insoluble residue.

SARSAPARILLA

Sarsaparilla

The dried root of *Smilax medica* Chamisso and Schlechtendal, *Smilax ornata* Hooker, *Smilax papyracea* Duhamel, or a dried root known commercially as Honduras Sarsaparilla, which is probably obtained from *Smilax officinalis* Kunth (Fam. *Liliaceæ*).

Usually more than 1 M. in length, and 4 to 6 Mm. thick, with few or many fine roots adhering; externally varying from light gray-brown and smooth, with few deep and sharp wrinkles, to dark or orange-brown and less smooth, and with more and smaller wrinkles; internally whitish, with a thick, mealy, or sometimes horny cortex, a circular wood-zone, and a thick pith; fracture tough; nearly inodorous; taste mucilaginous, somewhat sweetish and bitter, slightly acrid.

The thick, woody, knotty rhizome, if present, should be removed.

Average dose.— 2 Gm. (30 grains).

SASSAFRAS

Sassafras

The dried bark of the root of *Sassafras variifolium* (Salisbury) O. Kuntze (Syn. *Sassafras Sassafras* (Linné) Karsten) (Fam. *Lauraceæ*), collected in early spring or autumn, and deprived of the periderm.

In irregular transversely curved, reddish-brown pieces, of variable length and 0.5 to 5 Mm. thick; outer surface nearly smooth; inner surface obscurely short-striate; soft, fragile, with a short, corky fracture; strongly fragrant; taste mucilaginous, aromatic, and astringent.

Average dose.— 8 Gm. (120 grains).

SASSAFRAS MEDULLA

Sassafras Pith

The dried pith of *Sassafras variifolium* (Salisbury) O. Kuntze (Syn. *Sassafras Sassafras* (Linné) Karsten) (Fam. *Lauraceæ*).

In more or less cylindrical, often curved or coiled pieces of variable length and about 5 Mm. in diameter, whitish, very light, with a slight odor and a mucilaginous taste.

When macerated in water Sassafras Pith yields a mucilage which is not precipitated upon the addition of alcohol.

SCAMMONIUM

Scammony

A gum-resin obtained by incising the living root of *Convolvulus Scammonia* Linné (Fam. *Convolvulaceæ*).

In circular cakes or irregular, angular pieces of various sizes, greenish-gray or brownish-black, often covered with a grayish-white powder; very brittle, breaking with an angular fracture, porous and of a resinous lustre; internally of a uniform brownish-black color, more or less translucent in thin fragments; odor peculiar, somewhat cheese-like; taste slightly acrid.

Scammony is easily reduced to an ash-gray powder, which when triturated with water yields a greenish emulsion that does not effervesce on the addition of diluted hydrochloric acid; a decoction of Scammony, when cold, does not become blue with iodine T.S.; an alcoholic solution is not colored blue on the addition of tincture of ferric chloride; not less than 75 percent. should be soluble in ether, and when the residue left on the evaporation of the ethereal solution is dissolved in a hot solution of potassium or sodium hydroxide, it is not reprecipitated on the addition of diluted sulphuric acid; ash not more than 3 percent.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

SCILLA

Squill

The bulb of *Urginea maritima* (Linné) Baker (Fam. *Liliaceæ*), deprived of its dry, membranaceous outer scales, cut into thin slices and carefully dried, the central portions being rejected.

In irregular, more or less curved, somewhat translucent, yellowish-white or reddish-white segments, 3 to 5 Cm. long, brittle and pulverizable when dry, tough and flexible when damp; odor slight; taste mucilaginous, bitter, and acrid.

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

SCOPARIUS

Scoparius

The dried tops of *Cytisus Scoparius* (Linné) Link (Fam. *Leguminosæ*).

Thin, flexible, branched twigs, 2 to 3 Mm. thick; externally dark green, with five wings and numerous reddish-brown cork patches; internally yellowish; younger branches somewhat pubescent; fracture short-fibrous, that of thick pieces tough and splintery; usually free from the simple, obovate leaves; having a peculiar odor when bruised; taste disagreeably bitter.

Average dose.—1 Gm. (15 grains).

SCOPOLA

Scopola

The dried rhizome of *Scopola Carniolica* Jacquin (Fam. *Solanaceæ*), yielding, when assayed as directed below, not less than 0.5 percent. of mydriatic alkaloids.

Of horizontal growth, more or less curved and shortly and sharply flexuous, cylindraceous and somewhat flattened vertically, occurring mostly in pieces from 2.5 to 7.5 Cm. long and 0.8 to 1.6 Cm. broad, often split before drying; upper surface marked with closely set, large, cup-shaped stem scars, margins irregularly contracted; externally varying from yellowish-brown to dark brownish-gray, finely and irregularly wrinkled longitudinally, obscurely annulate and more or less nodular-roughened; fracture short and sharp, exhibiting a yellowish-white bark, its corky layer dark brown, or pale brown, wood indistinctly radiate, and central pith rather horny; nearly inodorous; taste sweetish, afterwards bitterish and strongly acrid.

Assay of Scopola

The method to be employed is identical with that given for Belladonna Leaves, on page 67, using *ten grammes* of Scopola, in No. 60 powder.

Average dose.—0.045 Gm. = 45 milligrammes (¾ grain).

SCOPOLAMINÆ HYDROBROMIDUM

Scopolamine Hydrobromide

$C_{17}H_{21}NO_4.HBr + 3H_2O = 434.92$

The hydrobromide [$HBr.C_{17}H_{21}NO_4 + 3H_2O$] of an alkaloid obtained from plants of the *Solanaceæ;* chemically identical with Hyoscine Hydrobromide (see *Hyoscinæ Hydrobromidum*).

Average dose.—0.0005 Gm. = 0.5 milligramme ($\frac{1}{128}$ grain).

SCUTELLARIA

Scutellaria

The dried plant of *Scutellaria lateriflora* Linné (Fam. *Labiatæ*).

About 50 Cm. long, smooth; stem quadrangular, branched; leaves opposite, petiolate, about 5 Cm. long, ovate-lanceolate or ovate-oblong, serrate; flowers about 6 Mm. long, in axillary one-sided racemes, with a pale blue corolla and bilabiate calyx, closed in fruit, the upper lip helmet-shaped; odor slight; taste bitterish.

Average dose.—1 Gm. (15 grains).

SENEGA

Senega

The dried root of *Polygala Senega* Linné (Fam. *Polygalaceæ*).

Somewhat cylindrical, tapering, more or less flexuous, 3 to 15 Cm. long and 2 to 8 Mm. thick, bearing several similar, horizontal branches and a few rootlets; crown knotty with numerous buds and short stem-remnants; externally yellowish-gray or brownish-yellow, longitudinally wrinkled, usually marked by a keel which is more prominent in perfectly dry roots near the crown; fracture short, wood light yellow, usually excentrically developed; odor slight, nauseating; taste sweetish, afterwards acrid.

Average dose.—1 Gm. (15 grains).

SENNA

Senna

The dried leaflets of *Cassia acutifolia* Delile (Alexandria Senna), or of *Cassia angustifolia* Vahl (India Senna) (Fam. *Leguminosæ*).

Alexandria Senna.—Leaflets about 25 Mm. long and 10 Mm. broad, having extremely short, stout petioles; inequilaterally lanceolate or lance-ovate, acutely cuspidate, entire, subcoriaceous, brittle, pale green or grayish-green, sparsely and obscurely hairy, especially beneath, the hairs appressed, 1-celled, and thick-walled; odor characteristic; taste somewhat mucilaginous and bitterish.

India Senna.—Leaflets 25 to 50 Mm. long, 10 to 15 Mm. broad, inequilaterally lanceolate, entire, thin, more abruptly pointed than those of Alexandria Senna, yellowish-green, and smooth above, paler beneath; in odor and taste closely resembling Alexandria Senna.

Senna should be free from stalks, and from Argel leaves, which are sometimes present in Alexandria Senna, and which are equilateral, 1-veined, thick, wrinkled, glaucous, and possess 3-celled hairs.

Average dose.—4 Gm. (60 grains).

SERPENTARIA

Serpentaria

The [illegible] d roots of *Aristolochia Serpentaria* Linné (Vir- [illegible] *Aristolochia reticulata* Nuttall (Texas Serpen- [illegible] *ceæ*).

[illegible] ia.—Rhizome of oblique growth, about 2 Cm. long and [illegible] er; externally yellowish-brown, slightly annulate, the [illegible] rous stem-scars or stem-bases, the lower surface bearing a dense tress of thin, branching roots from 4 to 7 Cm. long; fracture short, yellowish-brown; xylem in the roots 5-rayed; odor camphoraceous; taste bitter and aromatic.

Texas Serpentaria.—The rhizome is about twice as large as that of Virginia Serpentaria, of a grayish-brown color, and the roots are fewer, less interlacing, and thicker.

Average dose.—1 Gm. (15 grains).

SERUM ANTIDIPHTHERICUM

Antidiphtheric Serum • Diphtheria Antitoxin

A fluid separated from the coagulated blood of a horse *Equus caballus* Linné, immunized through the inoculation of diphtheric toxin. It should be kept in sealed glass containers, in a dark place, at temperatures between 4.5° and 15° C. (40° and 59° F.).

A yellowish or yellowish-brown, transparent or slightly turbid liquid, odorless or having a slight odor due to the presence of the antiseptic used as a preservative.

Specific gravity: 1.025 to 1.040 at 25° C. (77° F).

Antidiphtheric Serum gradually loses its power, the loss in one year varying between 10 percent. and 30 percent. Each container should be furnished with a label or statement, giving the strength of the Antidiphtheric Serum, expressed in antitoxic units, the name and percentage by volume of the antiseptic used for the preservation of the liquid (if such be used), the date when the Antidiphtheric Serum was last tested, and the date beyond which it will not have the strength indicated on the label or statement.

The standard of strength, expressed in units of antitoxic power, should be that approved or established by the United States Public Health and Marine Hospital Service.

Average dose.—3000 units.

Immunizing dose for well persons.—500 units.

SEVUM PRÆPARATUM

Prepared Suet

[SEVUM, PHARM. 1890]

The internal fat of the abdomen of the sheep *Ovis aries* Linné, purified by melting and straining.

Prepared Suet should be kept in well-closed vessels impervious to fat. It should not be used after it has become rancid.

A white, solid fat, nearly inodorous, and having a bland taste when fresh, but becoming rancid on prolonged exposure to the air.

Insoluble in water or cold alcohol; soluble in 44 parts of boiling alcohol, in about 60 parts of ether, and slowly in 2 parts of petroleum benzin. From its solution in the latter, when kept in a stoppered flask, it slowly separates in a crystalline form on standing.

An alcoholic solution of Prepared Suet is neutral or has only a slightly acid reaction upon litmus paper moistened with alcohol.

Prepared Suet melts between 45° and 50° C. (113° and 122° F.), and congeals between 37° and 40° C. (98.6° and 104° F.).

SINAPIS ALBA

White Mustard

The seed of *Sinapis alba* Linné (Fam. *Cruciferæ*).

Subglobular, 1 to 2 Mm. in diameter; testa yellowish, minutely pitted; embryo yellowish, oily, with a curved hypocotyl and two conduplicate cotyledons; inodorous; taste mildly pungent and acrid.

The powder contains few or no starch grains.

If 1 Gm. of powdered White Mustard be exhausted by slow percolation with alcohol, and the marc mixed with 200 Cc. of water and heated to boiling, and if, after cooling, sufficient cold water be added to make the mixture measure 1000 Cc., the addition of 4 Cc. of tenth-normal iodine V.S. should not produce a dark blue color (limit of *starch*).

Average dose.— Emetic, 8 Gm. (120 grains).

SINAPIS NIGRA

Black Mustard

The seed of *Brassica nigra* (Linné) Koch (Fam. *Cruciferæ*).

Subglobular, about 1.2 Mm. in diameter; testa deep red-brown, sometimes with a grayish tinge, minutely pitted; embryo greenish-yellow, oily, with a curved hypocotyl and two conduplicate cotyledons; odor while dry, slight, on moistening, powerfully irritating; taste strongly pungent and acrid.

The powder contains few or no starch grains.

If 1 Gm. of powdered Black Mustard be exhausted by slow percolation with alcohol, and the marc mixed with 200 Cc. of water and heated to boiling, and if, after cooling, sufficient cold water be added to make the mixture measure 1000 Cc., the addition of 4 Cc. of tenth-normal iodine V.S. should not produce a dark blue color (limit of *starch*).

Average dose.— Emetic, 8 Gm. (120 grains).

SODII ACETAS

Sodium Acetate

$NaC_2H_3O_2 + 3H_2O = 135.10$

It should contain in an uneffloresced condition not less than 99.5 percent. of pure Sodium Acetate [$CH_3.COONa + 3H_2O$], and should be kept in well-stoppered bottles.

Colorless, transparent, monoclinic prisms, or a granular, crystalline powder; odorless, and having a cooling, saline taste. Efflorescent in warm, dry air.

Soluble in about 1 part of water, and in 23 parts of alcohol at 25° C. (77° F.); and in all proportions of boiling water and of boiling alcohol.

When heated to 60° C. (140° F.), the salt begins to liquefy. At 123° C. (253.4° F.) it becomes dry and anhydrous; at 315° C. (599° F.) it is decomposed, with evolution of inflammable, empyreumatic vapors, leaving a black residue of sodium carbonate and carbon, which imparts to a non-luminous flame an intense yellow color, gives an alkaline reaction with litmus paper, and effervesces with acids.

An aqueous solution of the salt (1 in 20) should be alkaline to red litmus paper [illegible]ld not affect phenolphthalein.

If a few particles of the salt be added to a mixture of 1 Cc. of sulphuric acid and 1 Cc. of alcohol, and heated to boiling, acetic ether will be formed, recognizable by its odor.

On the addition of a few drops of ferric chloride T.S., the aqueous solution (1 in 20) assumes a deep red color, and, when boiled, yields a brown, flocculent precipitate of basic ferric acetate.

A saturated aqueous solution should not be rendered turbid by the addition of sodium bitartrate T.S. (limit of *potassium*).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

The aqueous solution of the salt (1 in 20), slightly acidulated with acetic acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of Sodium Acetate be thoroughly carbonized at a temperature not exceeding red heat, and the residue extracted with boiling distilled water until the washings cease to react with methyl-orange T.S., the mixed filtrate and washings should require for complete neutralization not less than 14.7 (14.74) Cc. of half-normal sulphuric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.— 1 Gm. (15 grains).

SODII ARSENAS

Sodium Arsenate

$Na_2HAsO_4 + 7H_2O = 309.84$

It should contain in an uneffloresced condition not less than 98 percent. of pure Di-sodium-ortho-arsenate $[AsO(OH)(ONa)_2 + 7H_2O]$, and should be kept in well-stoppered bottles.

Colorless, transparent, monoclinic prisms, odorless, and having a mild, alkaline taste; *caution should be used in tasting this salt, as it is very poisonous.* Efflorescent in dry air, and somewhat deliquescent in moist air.

Soluble in 1.2 parts of water at 25° C. (77° F.), and very soluble in boiling water; very sparingly soluble in cold, but nearly insoluble in boiling alcohol. When gently heated, the salt loses 5 molecules of water (28.8 percent.), and is converted into a white powder. At 148° C. (298.4° F.) it loses all of its water of crystallization, at a higher temperature the salt fuses, and at a red heat it is converted into pyroarsenate.

Sodium Arsenate should respond to the tests of identity and purity prescribed under *Sodii Arsenas Exsiccatus.*

Average dose.— 0.005 Gm. = 5 milligrammes ($\frac{1}{16}$ grain).

SODII ARSENAS EXSICCATUS

Exsiccated Sodium Arsenate

$Na_2HAsO_4 = 184.68$

It should contain not less than 98 percent. of pure anhydrous Di-sodium-ortho-arsenate $[AsO(OH)(ONa)_2]$.

Sodium Arsenate Crystals, *a sufficient quantity.*

Break the crystals into small fragments, and allow them to effloresce at a temperature between 40° and 50° C. (104° and 122° F.) until they are completely disintegrated; then gradually increase the temperature to 150° C. (302° F.), and continue the drying until the product ceases to lose weight. Reduce it to a fine powder, and transfer it to dry, well-stoppered bottles.

An amorphous, white powder; odorless, and having a mildly alkaline taste; *it should be tasted with great caution, as the salt is very poisonous.* Permanent in dry air.

Soluble in 3 parts of water at 25° C. (77° F.), and very soluble in boiling water; very sparingly soluble in cold, but nearly insoluble in boiling alcohol. When heated to 150° C. (302° F.), the salt should not lose weight; at red heat it is converted into pyroarsenate. It imparts an intense yellow color to a non-luminous flame.

The aqueous solution of the salt (1 in 20) yields a white precipitate with barium chloride T.S., or with calcium chloride T.S., and a dark red precipitate with silver nitrate T.S., all of which precipitates are soluble in nitric acid.

If 0.5 Cc. of an aqueous solution (1 in 20) be mixed with 2 Cc. of hydrochloric acid, and a drop of this mixture be placed upon a bright piece of copper-foil, then, upon applying a gentle heat, a dark steel-gray film will be deposited upon the copper.

If to 2 Cc. of an aqueous solution (1 in 20), 5 Cc. of tenth-normal silver nitrate V.S. be added, and the precipitate redissolved by a slight excess of ammonia water, no black precipitate of reduced silver should appear on boiling (absence of *arsenite*).

If to 5 Cc. of an aqueous solution (1 in 100), 1 Cc. of ammonium sulphide T.S. be added, no dark coloration should appear (absence of *lead, copper, iron,* etc.).

Average dose.—0.003 Gm. = 3 milligrammes ($\frac{1}{20}$ grain).

SODII BENZOAS

Sodium Benzoate

$NaC_7H_5O_2 = 143.01$

It should contain not less than 99 percent. of pure Sodium Benzoate [$C_6H_5.COONa$], and should be kept in well-stoppered bottles.

A white, amorphous, granular or crystalline powder; odorless, and having a sweetish astringent taste. Permanent in the air.

Soluble in 1.6 parts of water, and in 43 parts of alcohol at 25° C. (77° F.); in 1.3 parts of boiling water, and in 12 parts of boiling alcohol.

When heated, the salt melts, emits vapors having the odor of benzoic acid, then chars, and finally leaves a residue of sodium carbonate and carbon. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution is neutral or slightly alkaline to litmus paper.

If a few drops of ferric chloride T.S. be added to an aqueous solution of the salt, a salmon-colored precipitate will be deposited.

If 5 Cc. of diluted sulphuric acid be added to a solution of 1 Gm. of the salt in 10 Cc. of water, a white precipitate of benzoic acid will be produced, which, after being thoroughly washed, should conform to the tests of purity given under *Acidum Benzoicum.*

If an aqueous solution of the salt (1 in 20) be acidulated with hydrochloric acid and filtered, the filtrate should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of dry Sodium Benzoate be thoroughly ignited at red heat, and the residue extracted with boiling distilled water, until the washings cease to react with methyl-orange T.S., the mixed filtrate and washings should require for complete neutralization not less than 13.85 Cc. of half-normal hydrochloric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.—1 Gm. (15 grains).

SODII BICARBONAS

Sodium Bicarbonate

$NaHCO_3 = 83.43$

It should contain not less than 99 percent. of pure Sodium Bicarbonate [$CO(OH)(ONa)$], and should be kept in well-closed vessels, in a cool place.

A white, opaque powder, odorless, and having a cooling, mildly alkaline taste. Permanent in dry, but slowly decomposed in moist air.

Soluble in 12 parts of water at 15° C. (59° F.); above this temperature the solution gradually loses carbon dioxide, and at boiling heat the salt is entirely converted into normal carbonate; insoluble in alcohol.

When heated, the salt is decomposed into normal carbonate, water, and carbon dioxide, and finally, at 100° C. (212° F.), loses about 36.5 percent. of its weight. At a bright red heat it melts. To a non-luminous flame it imparts an intense yellow color.

The solution, when freshly prepared with cold distilled water, without shaking, gives a slightly alkaline reaction with litmus paper. The alkalinity increases by standing, agitation, or increase of temperature.

With acids the solution effervesces strongly.

If Sodium Bicarbonate be heated in a test-tube, no odor of ammonia should be evolved.

If 1 Gm. of the salt be dissolved in 19 Cc. of water, it should yield a perfectly clear and colorless solution, leaving no residue.

If 1 Gm. of the salt be dissolved without agitation in 20 Cc. of water, at a temperature not exceeding 15° C. (59° F.), and 0.2 Cc. of normal hydrochloric acid and 2 drops of phenolphthalein T.S. be added, a red tint should not appear immediately (limit of *carbonate*).

If 5 Cc. of an aqueous solution (1 in 20) be slightly supersaturated with hydrochloric acid, the liquid should not be colored red by a drop of ferric chloride T.S. (absence of *sulphocyanate*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Two Gm. of Sodium Bicarbonate should require for complete neutralization not less than 23.7 (23.74) Cc. of normal sulphuric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.—1 Gm. (15 grains).

SODII BISULPHIS

Sodium Bisulphite

$NaHSO_3 = 103.35$

It should contain not less than 90 percent. of pure Sodium Bisulphite, and should be kept in a cool place, in small, completely filled, well-stoppered bottles.

Opaque, prismatic crystals, or a granular powder, exhaling an odor of sulphur dioxide, and having a disagreeable, sulphurous taste. Exposed to the air, the salt loses sulphur dioxide, and is gradually oxidized to sulphate.

Soluble in 3.5 parts of water, and in 70 parts of alcohol at 25° C. (77° F.); in about 2 parts of boiling water, and in 49 parts of boiling alcohol.

When strongly heated, the salt decrepitates, emits vapors of sulphur and of sulphur dioxide, and leaves a residue of sodium sulphate. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution gives an acid reaction with blue litmus paper.

On the addition of hydrochloric or sulphuric acid, an aqueous solution of the salt evolves sulphur dioxide, which is recognized by its odor, and by its blackening a strip of paper dipped into mercurous nitrate T.S. and held over the escaping gas.

If 1 Gm. of Sodium Bisulphite be dissolved in 10 Cc. of diluted nitric acid, and the solution heated sufficiently to expel the gases, the liquid should not become turbid (absence of *thiosulphate*).

If 1 Gm. of the salt be dissolved in 20 Cc. of diluted hydrochloric acid, and heated sufficiently to expel the sulphur dioxide, the remaining solution, after being restored to its original volume, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If to 50 Cc. of tenth-normal iodine V.S., measured from a burette into a glass-stoppered vial (of about 100 Cc. capacity), 0.25 Gm. of finely powdered crystals of Sodium Bisulphite be added, the solution allowed to stand for about an hour, and shaken at frequent intervals, then the addition of not more than 6.45 Cc. of tenth-normal sodium thiosulphate V.S. should be required to decolorize the solution.

Average dose.—0.500 Gm. = 500 milligrammes ($7\frac{1}{2}$ grains).

SODII BORAS

Sodium Borate

$Na_2B_4O_7 + 10H_2O = 379.32$

It should contain in the uneffloresced condition not less than 99 percent. of pure sodium tetraborate, and should be kept in well-stoppered bottles.

Colorless, transparent, monoclinic prisms, or a white powder, inodorous, and having a sweetish, alkaline taste. Slightly efflorescent in warm, dry air.

Soluble in 17 parts of water at 25° C. (77° F.), and in 0.5 part of boiling water; insoluble in alcohol; it is soluble in 1 part of glycerin at 80° C. (176° F.).

When heated, the salt at first loses part of its water of crystallization, then melts, and, when further heated, swells up and forms a white, porous mass.

At a red heat it loses all of its water of crystallization (47 percent.), and fuses to a colorless glass. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution (1 in 20) colors red litmus paper blue, and yellow turmeric paper reddish-brown. After being acidulated with hydrochloric acid, the solution colors blue litmus paper red; yellow turmeric paper remains unchanged at first, but on drying, becomes brownish-red, and this color is temporarily changed to bluish-black by moistening with ammonia water.

If a drop of the solution of Sodium Borate in glycerin be held in a non-luminous flame, a transient bright green color will appear.

If a slight excess of diluted sulphuric acid be added to a hot, saturated, aqueous solution of the salt, shining, scaly crystals of boric acid will separate on cooling, which, when dissolved in alcohol and the liquid ignited, impart a green color to the flame.

With 21 Cc. of water, 1 Gm. of Sodium Borate should yield a perfectly clear and colorless solution, leaving no residue.

The aqueous solution (1 in 20) should not effervesce with acids (absence of *carbonate* or *bicarbonate*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

The aqueous solution (1 in 20) should not be rendered turbid by magnesia mixture (absence of *phosphate*).

If 1 Gm. of the salt be dissolved in 20 Cc. of diluted sulphuric acid by the aid of heat, and 3 drops of indigo T.S. be added, the blue color should not be discharged after heating for ten minutes on a water-bath (absence of *nitrate*).

Average dose.—0.500 Gm. = 500 milligrammes ($7\frac{1}{2}$ grains).

SODII BROMIDUM

Sodium Bromide

$NaBr = 102.24$

It should contain, when dried, not less than 97 percent. of pure Sodium Bromide, and should be kept in well-stoppered bottles.

Colorless or white, cubical crystals, or a white, granular powder, odorless, and having a saline, slightly bitter taste. The salt absorbs moisture from the air without deliquescing.

Soluble in about 1.7 parts of water, and in 12.5 parts of alcohol at 25° C. (77°F.); in 0.8 part of boiling water, and in 11 parts of boiling alcohol.

When heated to a bright red heat, the salt melts, and, at a somewhat higher temperature, slowly volatilizes without decomposition. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution (1 in 20) is neutral or shows a faintly alkaline reaction with red litmus paper.

Silver Nitrate T.S. added to a concentrated aqueous solution produces a yellowish-white precipitate, insoluble in nitric acid and in a moderate excess of ammonia water.

If 1 Gm. of the salt be dissolved in 10 Cc. of water and 0.1 Cc. of tenth-normal sulphuric acid V.S. be added, no color should be produced by the subsequent addition of a drop of phenolphthalein T.S., even after boiling (limit of *alkali*).

If to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform be added, and then chlorine water which has been diluted with an equal volume of water be cautiously introduced, drop by drop, with constant agitation, the liberated bromine will dissolve in the chloroform, imparting to it a yellow to orange color, free from any violet tint (absence of *iodide*).

The aqueous solution of Sodium Bromide (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If diluted sulphuric acid be dropped upon some of the powdered salt, no yellow color should appear at once (absence of *bromate*).

Ten Cc. of the aqueous solution of the salt (1 in 20), when acidulated with hydrochloric acid, should not be rendered turbid by the addition of 1 Cc. of potassium sulphate T.S. (absence of *barium*).

If 0.3 Gm. of the well-dried salt be dissolved in about 50 Cc. of water, and 2 or 3 drops of potassium chromate T.S. be added, it should require not less than 28.5 nor more than 30 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color.

Average dose.—1 Gm. (15 grains).

SODII CARBONAS MONOHYDRATUS

Monohydrated Sodium Carbonate

$Na_2CO_3 + H_2O = 123.19$

It should contain not less than 85 percent. of pure anhydrous Sodium Carbonate [$CO.(ONa)_2$], corresponding to not less than 99.5 percent. of the crystallized monohydrated salt.

A white, crystalline, granular powder, odorless, and having a strongly alkaline taste. When exposed to the air, under ordinary conditions, it absorbs only a slight percentage of moisture; exposed to warm, dry air at or above 50° C. (122° F.) the salt effloresces, and at 100° C. (212° F.) it loses its water of crystallization (14.52 percent.).

Soluble in 2.9 parts of water at 25° C. (77° F.), and in 1.8 parts of boiling water; insoluble in alcohol and in ether; soluble in 8 parts of glycerin.

The aqueous solution shows an alkaline reaction with red litmus paper, and effervesces strongly with acids. To a non-luminous flame the solution imparts an intense yellow color.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of Monohydrated Sodium Carbonate, or 0.855 Gm. of the anhydrous salt, be dissolved in 10 Cc. of distilled water, it should require not less than 32.3 Cc. of half-normal sulphuric acid V.S. for neutralization, 3 drops of methyl-orange T.S. being used as indicator.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

SODII CHLORAS

Sodium Chlorate

$NaClO_3 = 105.70$

It should contain not less than 99 percent. of pure Sodium Chlorate [$ClO_2.ONa$].

This salt should be kept in well-stoppered bottles, and *great caution should be observed* in handling it, as dangerous explosions are liable to occur when it is heated, or subjected to concussion or trituration with organic substances (cork, tannic acid, sugar, etc.), or with sulphur, antimony sulphide, phosphorus, or other easily oxidizable substances.

Colorless, transparent crystals (principally cubes with tetrahedral facets), or a crystalline powder; odorless, and having a cooling, saline taste. Permanent in dry air.

Soluble in about 1 part of water, and in about 100 parts of alcohol at 25° C. (77° F.); in 0.5 part of boiling water, and in about 40 parts of boiling alcohol; also soluble in about 5 parts of glycerin.

When heated, the salt melts, then gives off oxygen (about 45 percent. of its weight), and finally leaves a residue of sodium chloride, readily soluble in water, and yielding, with silver nitrate T.S., a white, curdy precipitate, insoluble in nitric acid. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution of Sodium Chlorate (1 in 20) is neutral to litmus paper.

When a crystal of the salt is dropped into hydrochloric acid, the liquid assumes a deep greenish-yellow color, and emits the odor of chlorine.

A saturated, aqueous solution should not be rendered turbid by sodium bitartrate T.S. (limit of *potassium*).

The aqueous solution of the salt (1 in 20), upon the addition of 1 Cc. of ammonium sulphide T.S., should not develop a dark coloration (absence of *lead*, *copper*, etc.).

Average dose.— 0.250 Gm. = 250 milligrammes (4 grains).

SODII CHLORIDUM

Sodium Chloride

$NaCl = 58.06$

It should contain when dried not less than 99 percent. of pure Sodium Chloride.

Colorless, transparent, cubical crystals, or a white, crystalline powder, odorless, and having a purely saline taste. Permanent in dry air.

Soluble in 2.8 parts of water at 25° C. (77° F.), and in 2.5 parts of boiling water; almost insoluble in alcohol.

When heated, the salt decrepitates. At a red heat it fuses, and at a white heat it is slowly volatilized and partly decomposed. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution of the salt is neutral to litmus paper.

With silver nitrate T.S. the solution yields a white, curdy precipitate, insoluble in nitric acid, and readily soluble in ammonia water.

The aqueous solution of Sodium Chloride (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 2 Gm. of the finely powdered salt be digested for some hours with 25 Cc. of warm alcohol, and, after cooling, the undissolved salt be removed by filtration, the filtrate evaporated to dryness, and the residue dissolved in 5 Cc. of water, and if 1 Cc. of chloroform be added, and chlorine water which has been diluted with twice its volume of water, cautiously introduced, drop by drop, with constant agitation, the chloroform should not acquire a violet, yellow, or orange color (absence of *bromide* and *iodide*).

If 1 Gm. of well-dried Sodium Chloride be dissolved in sufficient distilled water to measure 100 Cc., and 10 Cc. of the solution be mixed with a few drops of potassium chromate T.S., it should require not less than 17 (17.05) Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color.

Average dose.—Emetic, 16 Gm. (240 grains).

SODII CITRAS

Sodium Citrate

$2Na_3C_6H_5O_7 + 11H_2O = 709.20$

It should contain not less than 97 percent. of pure Sodium Citrate $[2C_3H_4(OH)(COONa)_3 + 11H_2O]$, and should be kept in well-stoppered bottles.

they are completely disintegrated; then gradually increase the temperature to 150° C. (302° F.), and continue the drying until the product ceases to lose weight. Reduce it to a fine powder, and transfer it to dry, well-stoppered bottles.

An amorphous, white powder; odorless, and having a mildly alkaline taste; *it should be tasted with great caution, as the salt is very poisonous.* Permanent in dry air.

Soluble in 3 parts of water at 25° C. (77° F.), and very soluble in boiling water; very sparingly soluble in cold, but nearly insoluble in boiling alcohol. When heated to 150° C. (302° F.), the salt should not lose weight; at red heat it is converted into pyroarsenate. It imparts an intense yellow color to a non-luminous flame.

The aqueous solution of the salt (1 in 20) yields a white precipitate with barium chloride T.S., or with calcium chloride T.S., and a dark red precipitate with silver nitrate T.S., all of which precipitates are soluble in nitric acid.

If 0.5 Cc. of an aqueous solution (1 in 20) be mixed with 2 Cc. of hydrochloric acid, and a drop of this mixture be placed upon a bright piece of copper-foil, then, upon applying a gentle heat, a dark steel-gray film will be deposited upon the copper.

If to 2 Cc. of an aqueous solution (1 in 20), 5 Cc. of tenth-normal silver nitrate V.S. be added, and the precipitate redissolved by a slight excess of ammonia water, no black precipitate of reduced silver should appear on boiling (absence of *arsenite*).

If to 5 Cc. of an aqueous solution (1 in 100), 1 Cc. of ammonium sulphide T.S. be added, no dark coloration should appear (absence of *lead*, *copper*, *iron*, etc.).

Average dose.—0.003 Gm. = 3 milligrammes ($\frac{1}{20}$ grain).

SODII BENZOAS

Sodium Benzoate

$NaC_7H_5O_2 = 143.01$

It should contain not less than 99 percent. of pure Sodium Benzoate [$C_6H_5.COONa$], and should be kept in well-stoppered bottles.

A white, amorphous, granular or crystalline powder; odorless, and having a sweetish astringent taste. Permanent in the air.

Soluble in 1.6 parts of water, and in 43 parts of alcohol at 25° C. (77° F.); in 1.3 parts of boiling water, and in 12 parts of boiling alcohol.

When heated, the salt melts, emits vapors having the odor of benzoic acid, then chars, and finally leaves a residue of sodium carbonate and carbon. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution is neutral or slightly alkaline to litmus paper.

If a few drops of ferric chloride T.S. be added to an aqueous solution of the salt, a salmon-colored precipitate will be deposited.

If 5 Cc. of diluted sulphuric acid be added to a solution of 1 Gm. of the salt in 10 Cc. of water, a white precipitate of benzoic acid will be produced, which, after being thoroughly washed, should conform to the tests of purity given under *Acidum Benzoicum.*

If an aqueous solution of the salt (1 in 20) be acidulated with hydrochloric acid and filtered, the filtrate should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of dry Sodium Benzoate be thoroughly ignited at red heat, and the residue extracted with boiling distilled water, until the washings cease to react with methyl-orange T.S., the mixed filtrate and washings should require for complete neutralization not less than 13.85 Cc. of half-normal hydrochloric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.—1 Gm. (15 grains).

SODII BICARBONAS

Sodium Bicarbonate

$NaHCO_3 = 83.43$

It should contain not less than 99 percent. of pure Sodium Bicarbonate [CO(OH)(ONa)], and should be kept in well-closed vessels, in a cool place.

A white, opaque powder, odorless, and having a cooling, mildly alkaline taste. Permanent in dry, but slowly decomposed in moist air.

Soluble in 12 parts of water at 15° C. (59° F.); above this temperature the solution gradually loses carbon dioxide, and at boiling heat the salt is entirely converted into normal carbonate; insoluble in alcohol.

When heated, the salt is decomposed into normal carbonate, water, and carbon dioxide, and finally, at 100° C. (212° F.), loses about 36.5 percent. of its weight. At a bright red heat it melts. To a non-luminous flame it imparts an intense yellow color.

The solution, when freshly prepared with cold distilled water, without shaking, gives a slightly alkaline reaction with litmus paper. The alkalinity increases by standing, agitation, or increase of temperature.

With acids the solution effervesces strongly.

If Sodium Bicarbonate be heated in a test-tube, no odor of ammonia should be evolved.

If 1 Gm. of the salt be dissolved in 19 Cc. of water, it should yield a perfectly clear and colorless solution, leaving no residue.

If 1 Gm. of the salt be dissolved without agitation in 20 Cc. of water, at a temperature not exceeding 15° C. (59° F.), and 0.2 Cc. of normal hydrochloric acid and 2 drops of phenolphthalein T.S. be added, a red tint should not appear immediately (limit of *carbonate*).

If 5 Cc. of an aqueous solution (1 in 20) be slightly supersaturated with hydrochloric acid, the liquid should not be colored red by a drop of ferric chloride T.S. (absence of *sulphocyanate*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Two Gm. of Sodium Bicarbonate should require for complete neutralization not less than 23.7 (23.74) Cc. of normal sulphuric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.—1 Gm. (15 grains).

SODII BISULPHIS

Sodium Bisulphite

$NaHSO_3 = 103.35$

It should contain not less than 90 percent. of pure Sodium Bisulphite, and should be kept in a cool place, in small, completely filled, well-stoppered bottles.

Opaque, prismatic crystals, or a granular powder, exhaling an odor of sulphur dioxide, and having a disagreeable, sulphurous taste. Exposed to the air, the salt loses sulphur dioxide, and is gradually oxidized to sulphate.

Soluble in 3.5 parts of water, and in 70 parts of alcohol at 25° C. (77° F.); in about 2 parts of boiling water, and in 49 parts of boiling alcohol.

When strongly heated, the salt decrepitates, emits vapors of sulphur and of sulphur dioxide, and leaves a residue of sodium sulphate. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution gives an acid reaction with blue litmus paper.

On the addition of hydrochloric or sulphuric acid, an aqueous solution of the salt evolves sulphur dioxide, which is recognized by its odor, and by its blackening a strip of paper dipped into mercurous nitrate T.S. and held over the escaping gas.

If 1 Gm. of Sodium Bisulphite be dissolved in 10 Cc. of diluted nitric acid, and the solution heated sufficiently to expel the gases, the liquid should not become turbid (absence of *thiosulphate*).

If 1 Gm. of the salt be dissolved in 20 Cc. of diluted hydrochloric acid, and heated sufficiently to expel the sulphur dioxide, the remaining solution, after being restored to its original volume, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If to 50 Cc. of tenth-normal iodine V.S., measured from a burette into a glass-stoppered vial (of about 100 Cc. capacity), 0.25 Gm. of finely powdered crystals of Sodium Bisulphite be added, the solution allowed to stand for about an hour, and shaken at frequent intervals, then the addition of not more than 6.45 Cc. of tenth-normal sodium thiosulphate V.S. should be required to decolorize the solution.

***Average dose.*—0.500 Gm. = 500 milligrammes (7½ grains).**

SODII BORAS

Sodium Borate

$Na_2B_4O_7 + 10H_2O = 379.32$

It should contain in the uneffloresced condition not less than 99 percent. of pure sodium tetraborate, and should be kept in well-stoppered bottles.

Colorless, transparent, monoclinic prisms, or a white powder, inodorous, and having a sweetish, alkaline taste. Slightly efflorescent in warm, dry air.

Soluble in 17 parts of water at 25° C. (77° F.), and in 0.5 part of boiling water; insoluble in alcohol; it is soluble in 1 part of glycerin at 80° C. (176° F.).

When heated, the salt at first loses part of its water of crystallization, then melts, and, when further heated, swells up and forms a white, porous mass.

At a red heat it loses all of its water of crystallization (47 percent.), and fuses to a colorless glass. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution (1 in 20) colors red litmus paper blue, and yellow turmeric paper reddish-brown. After being acidulated with hydrochloric acid, the solution colors blue litmus paper red; yellow turmeric paper remains unchanged at first, but on drying, becomes brownish-red, and this color is temporarily changed to bluish-black by moistening with ammonia water.

If a drop of the solution of Sodium Borate in glycerin be held in a non-luminous flame, a transient bright green color will appear.

If a slight excess of diluted sulphuric acid be added to a hot, saturated, aqueous solution of the salt, shining, scaly crystals of boric acid will separate on cooling, which, when dissolved in alcohol and the liquid ignited, impart a green color to the flame.

With 21 Cc. of water, 1 Gm. of Sodium Borate should yield a perfectly clear and colorless solution, leaving no residue.

The aqueous solution (1 in 20) should not effervesce with acids (absence of *carbonate* or *bicarbonate*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

The aqueous solution (1 in 20) should not be rendered turbid by magnesia mixture (absence of *phosphate*).

If 1 Gm. of the salt be dissolved in 20 Cc. of diluted sulphuric acid by the aid of heat, and 3 drops of indigo T.S. be added, the blue color should not be discharged after heating for ten minutes on a water-bath (absence of *nitrate*).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

SODII BROMIDUM

Sodium Bromide

$NaBr = 102.24$

It should contain, when dried, not less than 97 percent. of pure Sodium Bromide, and should be kept in well-stoppered bottles.

Colorless or white, cubical crystals, or a white, granular powder, odorless, and having a saline, slightly bitter taste. The salt absorbs moisture from the air without deliquescing.

Soluble in about 1.7 parts of water, and in 12.5 parts of alcohol at 25° C. (77°F.); in 0.8 part of boiling water, and in 11 parts of boiling alcohol.

When heated to a bright red heat, the salt melts, and, at a somewhat higher temperature, slowly volatilizes without decomposition. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution (1 in 20) is neutral or shows a faintly alkaline reaction with red litmus paper.

Silver Nitrate T.S. added to a concentrated aqueous solution produces a yellowish-white precipitate, insoluble in nitric acid and in a moderate excess of ammonia water.

If 1 Gm. of the salt be dissolved in 10 Cc. of water and 0.1 Cc. of tenth-normal sulphuric acid V.S. be added, no color should be produced by the subsequent addition of a drop of phenolphthalein T.S., even after boiling (limit of *alkali*).

If to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform be added, and then chlorine water which has been diluted with an equal volume of water be cautiously introduced, drop by drop, with constant agitation, the liberated bromine will dissolve in the chloroform, imparting to it a yellow to orange color, free from any violet tint (absence of *iodide*).

The aqueous solution of Sodium Bromide (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If diluted sulphuric acid be dropped upon some of the powdered salt, no yellow color should appear at once (absence of *bromate*).

Ten Cc. of the aqueous solution of the salt (1 in 20), when acidulated with hydrochloric acid, should not be rendered turbid by the addition of 1 Cc. of potassium sulphate T.S. (absence of *barium*).

If 0.3 Gm. of the well-dried salt be dissolved in about 50 Cc. of water, and 2 or 3 drops of potassium chromate T.S. be added, it should require not less than 28.5 nor more than 30 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color.

Average dose.—1 Gm. (15 grains).

The aqueous solution of the salt (1 in 20), acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 5 Cc. of the aqueous solution of the salt (1 in 10) be measured into a beaker containing 3 Cc. of nitric acid, diluted with about 10 Cc. of water and evaporated to dryness on a water-bath, the residue should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.—1 Gm. (15 grains).

SODII IODIDUM

Sodium Iodide

$NaI = 148.78$

It should contain not less than 98 percent. of pure Sodium Iodide, and should be kept in well-stoppered bottles.

Colorless, cubical crystals, or a white, crystalline powder; odorless, and having a saline and slightly bitter taste. In moist air Sodium Iodide deliquesces and frequently undergoes decomposition, the salt assuming a brown tint.

Soluble in about 0.5 part of water, and in about 3 parts of alcohol at 25° C. (77° F.); in 0.33 part of boiling water, and in 1.4 parts of boiling alcohol.

When strongly heated the salt melts, and at a bright red heat it is slowly volatilized and partly decomposed. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution of Sodium Iodide is slightly alkaline to red litmus paper.

If 1 Gm. of the salt be dissolved in water, and 0.1 Cc. of tenth-normal sulphuric acid V.S. be added, no red color should be produced by the addition of a drop of phenolphthalein T.S. even after heating (limit of *alkali*).

If to 5 Cc. of the aqueous solution (1 in 20) 1 Cc. of chlorine water be added, iodine will be liberated and impart to the solution a light reddish-brown color. On agitating this mixture with a few drops of chloroform, the latter will acquire a violet color.

A solution of 1 Gm. of the salt in 1 Cc. of water should yield no precipitate with 1 Cc. of sodium bitartrate T.S. (limit of *potassium*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 0.5 Gm. of the salt be dissolved in 10 Cc. of distilled water, which has been previously boiled and cooled in a small flask, the solution should not have a distinct yellow tint (absence of *free iodine*), nor should the solution acquire a yellow color within half a minute after the addition of 2 drops of diluted sulphuric acid (which should be free from sulphurous acid or nitrous acid) (limit of *iodate*).

Ten Cc. of the aqueous solution of the salt (1 in 20), when acidulated with hydrochloric acid, should not be rendered turbid by the addition of 1 Cc. of potassium sulphate T.S. (absence of *barium*).

If 5 Cc. of the aqueous solution be gently heated with 1 drop of ferrous sulphate T.S., 1 drop of ferric chloride T.S., and 0.5 Cc. of potassium hydroxide T.S., no blue color should appear after acidulating the mixture with hydrochloric acid (absence of *cyanide*).

If to 1 Gm. of Sodium Iodide, contained in a test-tube of about 40 Cc. capacity, 5 Cc. of water, 5 Cc. of potassium hydroxide T.S., and about 0.2 Gm. of aluminum wire be added, and if in the upper portion of the test-tube a pledget of purified cotton be inserted, and over the mouth there be placed a piece of moistened red litmus paper, then if the tube be heated upon a water-bath for fifteen minutes, no blue coloration of the paper should be discernible (limit of *nitrates* and *nitrites*).

If 0.2 Gm. of Sodium Iodide be dissolved in 2 Cc. of ammonia water, and 15 Cc. of tenth-normal silver nitrate V.S. be added, then after thoroughly agitating and filtering, the filtrate, upon supersaturating with nitric acid, should not become more than slightly turbid, nor should any darkening appear within ten minutes (limit of *chlorides* and *bromides*, and absence of *thiosulphate*).

If 0.5 Gm. of the well-dried salt be dissolved in 10 Cc. of distilled water, and about 5 drops of potassium chromate T.S. be added, it should require not more than 34.6 Cc. nor less than 33 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color (corresponding to at least 98 percent. of pure Sodium Iodide).

Average dose.—0.500 Gm. = 500 milligrammes (7½ grains).

SODII NITRAS

Sodium Nitrate

$NaNO_3 = 84.45$

It should contain not less than 99 percent. of pure Sodium Nitrate [$NO_2.ONa$], and should be kept in well-stoppered bottles.

Colorless, transparent, rhombohedral crystals, odorless, and having a cooling saline, and slightly bitter taste. Hygroscopic in moist air.

Soluble in about 1.1 parts of water, and in about 100 parts of alcohol at 25° C. (77° F.); in 0.6 part of boiling water, and in 40 parts of boiling alcohol.

When heated to 312° C. (593.6° F.), the salt melts without decomposition. At a higher temperature it evolves oxygen, and is reduced to nitrite. When Sodium Nitrate is heated with charcoal, the mixture deflagrates. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution is neutral to litmus paper.

If the aqueous solution be mixed in a test-tube with a drop of diphenylamine T.S., and sulphuric acid be carefully poured in, so as to form a separate layer, a deep blue color will appear at the line of contact.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform be added, and then chlorine water which has been diluted with an equal volume of water be introduced, drop by drop, with agitation, the chloroform should remain free from any violet tint (absence of *iodide*).

Average dose.—1 Gm. (15 grains).

SODII NITRIS

Sodium Nitrite

$NaNO_2 = 68.57$

It should contain not less than 90 percent. of pure Sodium Nitrite [$NO.ONa$], and should be kept in well-stoppered bottles.

White, or nearly white, opaque, fused masses, or pencils, or colorless, transparent, hexagonal crystals; odorless, and having a mild, saline taste.

When exposed to the air, the salt deliquesces and is gradually oxidized to sodium nitrate, and becomes unfit for use.

Soluble in about 1.4 parts of water at 25° C. (77° F.), and very soluble in boiling water; slightly soluble in alcohol.

When heated, the salt melts, and at a red heat it is decomposed, yielding oxygen, nitrogen, nitrogen dioxide, and sodium oxide. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution of Sodium Nitrite should be colorless and give a slightly alkaline reaction with red litmus paper.

If the aqueous solution of the salt be mixed with some potassium iodide T.S., and a few drops of an acid added, iodine will be liberated, and nitrogen dioxide gas will escape with effervescence.

If 1 Gm. of the salt be dissolved in 20 Cc. of diluted hydrochloric acid, and heated sufficiently to expel the gases, the resulting solution after restoring it to its original volume should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If to 30 Cc. of tenth-normal potassium permanganate V.S., diluted with about 150 Cc. of distilled water, 5 Cc. of sulphuric acid and 10 Cc. of a solution of 1 Gm. of Sodium Nitrite in sufficient distilled water to make 100 Cc. be successively added, the liquid brought to a temperature of 40° C. (104° F.) and allowed to stand for five minutes, not more than 3.75 Cc. of tenth-normal oxalic acid V.S. should be required to decolorize the solution (each Cc. of tenth-normal potassium permanganate consumed corresponding to 0.0034285 Gm. of pure Sodium Nitrite).

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

SODII PHENOLSULPHONAS

Sodium Phenolsulphonate

$NaC_6H_5O_4S + 2H_2O = 230.45$

[SODII SULPHOCARBOLAS, PHARM. 1890]

It should contain not less than 99 percent. of pure Sodium Paraphenolsulphonate [$C_6H_4(OH)SO_3Na$ 1:4 + $2H_2O$], and should be kept in well-stoppered bottles.

Colorless, transparent, rhombic prisms; odorless, and having a cooling, saline, bitter taste. Somewhat efflorescent in dry air.

Soluble in 4.8 parts of water, and in about 130 parts of alcohol at 25° C. (77° F.); in 0.7 part of boiling water, and in 10 parts of boiling alcohol.

When heated a little above 100° C. (212° F.), the salt loses all of its water of crystallization (15.5 percent.), and becomes white. At a higher temperature it chars, emits inflammable vapors having the odor of phenol, and finally leaves a residue of sodium sulphate amounting to 30.6 percent. of the original weight. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution of Sodium Phenolsulphonate is neutral to litmus paper.

A diluted solution of the salt (1 in 100) is rendered pale violet by ferric chloride T.S., but remains clear; barium chloride T.S. leaves the solution clear, but if a portion of the salt be ignited, and the residue dissolved in water, the same reagent will produce in the solution a copious, white precipitate.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see [illegible]ndix, Test No. 121).

[illegible] *dose.*— 0.250 Gm. = 250 milligrammes (4 grains).

If 0.2 Gm. of Sodium Iodide be dissolved in 2 Cc. of ammonia water, and 15 Cc. of tenth-normal silver nitrate V.S. be added, then after thoroughly agitating and filtering, the filtrate, upon supersaturating with nitric acid, should not become more than slightly turbid, nor should any darkening appear within ten minutes (limit of *chlorides* and *bromides*, and absence of *thiosulphate*).

If 0.5 Gm. of the well-dried salt be dissolved in 10 Cc. of distilled water, and about 5 drops of potassium chromate T.S. be added, it should require not more than 34.6 Cc. nor less than 33 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color (corresponding to at least 98 percent. of pure Sodium Iodide).

***Average dose.*—0.500 Gm. = 500 milligrammes (7½ grains).**

SODII NITRAS

Sodium Nitrate

$NaNO_3 = 84.45$

It should contain not less than 99 percent. of pure Sodium Nitrate [$NO_2.ONa$], and should be kept in well-stoppered bottles.

Colorless, transparent, rhombohedral crystals, odorless, and having a cooling saline, and slightly bitter taste. Hygroscopic in moist air.

Soluble in about 1.1 parts of water, and in about 100 parts of alcohol at 25° C. (77° F.); in 0.6 part of boiling water, and in 40 parts of boiling alcohol.

When heated to 312° C. (593.6° F.), the salt melts without decomposition. At a higher temperature it evolves oxygen, and is reduced to nitrite. When Sodium Nitrate is heated with charcoal, the mixture deflagrates. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution is neutral to litmus paper.

If the aqueous solution be mixed in a test-tube with a drop of diphenylamine T.S., and sulphuric acid be carefully poured in, so as to form a separate layer, a deep blue color will appear at the line of contact.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform be added, and then chlorine water which has been diluted with an equal volume of water be introduced, drop by drop, with agitation, the chloroform should remain free from any violet tint (absence of *iodide*).

***Average dose.*—1 Gm. (15 grains).**

SODII NITRIS

Sodium Nitrite

$NaNO_2 = 68.57$

It should contain not less than 90 percent. of pure Sodium Nitrite [$NO.ONa$], and should be kept in well-stoppered bottles.

White, or nearly white, opaque, fused masses, or pencils, or colorless, transparent, hexagonal crystals; odorless, and having a mild, saline taste.

When exposed to the air, the salt deliquesces and is gradually oxidized to sodium nitrate, and becomes unfit for use.

Soluble in about 1.4 parts of water at 25° C. (77° F.), and very soluble in boiling water; slightly soluble in alcohol.

When heated, the salt melts, and at a red heat it is decomposed, yielding oxygen, nitrogen, nitrogen dioxide, and sodium oxide. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution of Sodium Nitrite should be colorless and give a slightly alkaline reaction with red litmus paper.

If the aqueous solution of the salt be mixed with some potassium iodide T.S. and a few drops of an acid added, iodine will be liberated, and nitrogen dioxide gas will escape with effervescence.

If 1 Gm. of the salt be dissolved in 20 Cc. of diluted hydrochloric acid, and heated sufficiently to expel the gases, the resulting solution after restoring it to its original volume should not respond to the Time-Limit Test for heavy metals (see Appendix, Test No. 137).

If to 50 Cc. of tenth-normal potassium permanganate V.S., diluted with about 250 Cc. of distilled water, 5 Cc. of sulphuric acid and 10 Cc. of a solution of 1 Gm. of Sodium Nitrite in sufficient distilled water to make 100 Cc. be successively added, the liquid brought to a temperature of 40° C. (104° F.) and allowed to stand for five minutes, not more than 4.75 Cc. of tenth-normal oxalic acid V.S. should be required to decolorize the solution (each Cc. of tenth-normal potassium permanganate consumed corresponding to 0.0034285 Gm. of pure Sodium Nitrite).

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

SODII PHENOLSULPHONAS

Sodium Phenolsulphonate

$NaC_6H_5O_4S + 2H_2O = 230.45$

[SODII SULPHOCARBOLAS, PHARM. 1890]

It should contain not less than 99 percent. of pure Sodium Paraphenolsulphonate [$C_6H_4(OH)(SO_3Na)$ 1:4 + $2H_2O$], and should be kept in well-stoppered bottles.

Colorless, transparent, rhombic prisms; odorless, and having a cooling, saline, bitter taste. Somewhat efflorescent in dry air.

Soluble in 4.8 parts of water, and in about 130 parts of alcohol at 25° C. (77° F.); in 0.7 part of boiling water, and in 10 parts of boiling alcohol.

When heated a little above 100° C. (212° F.), the salt loses all of its water of crystallization (15.5 percent), and becomes white. At a higher temperature it chars, emits inflammable vapors having the odor of phenol, and finally leaves a residue of sodium sulphate amounting to 30.6 percent of the original weight. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution of Sodium Phenolsulphonate is neutral to litmus paper.

A diluted solution of the salt (1 in 100) is rendered pale violet by ferric chloride T.S., but remains clear; barium chloride T.S. leaves the solution clear, but if a portion of the salt be ignited, and the residue dissolved in water, the same reagent will produce in the solution a copious, white precipitate.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for heavy metals (see Appendix, Test No. 137).

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

SODII PHOSPHAS

Sodium Phosphate

$Na_2HPO_4 + 12H_2O = 355.61$

It should contain, in an uneffloresced condition, not less than 99 percent. of pure Di-sodium-ortho-phosphate [$PO.(OH)(ONa)_2 + 12H_2O$], and should be kept in well-stoppered bottles, in a cool place.

Large, colorless, monoclinic prisms, or a granular, crystalline salt; odorless, and having a cooling, saline taste. The crystals effloresce in the air, and gradually lose 5 molecules of their water of crystallization (25.1 percent.).

Soluble in about 5.5 parts of water at 25° C. (77° F.) ; insoluble in alcohol.

When heated to about 40° C. (104° F.), the salt fuses, yielding a colorless liquid. At 100° C. (212° F.) it loses all its water of crystallization (60.3 percent.), and at a red heat it is converted into sodium pyrophosphate. It imparts to a non-luminous flame an intense yellow color.

An aqueous solution of Sodium Phosphate is slightly alkaline to red litmus and phenolphthalein paper.

An aqueous solution of the salt (1 in 20) yields a white, crystalline precipitate with magnesia mixture T.S.

With silver nitrate T.S. an aqueous solution yields a yellow precipitate, soluble in ammonia water and in nitric acid.

If 0.5 Cc. of the aqueous solution (1 in 20) be mixed with 1 Cc. of ammonium molybdate T.S., the mixture will at once assume a yellow color, and after being gently heated a few minutes will yield a yellow precipitate.

Not more than a slight turbidity should appear on dissolving 1 Gm. of the salt in 20 Cc. of water (limit of *calcium*, *aluminum*, etc.).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

No effervescence should occur on the addition of hydrochloric or nitric acid to a solution of the salt (absence of *carbonate*).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.— 2 Gm. (30 grains).

SODII PHOSPHAS EFFERVESCENS

Effervescent Sodium Phosphate

Exsiccated Sodium Phosphate, in fine powder, *two hundred grammes*	**200 Gm.**
Sodium Bicarbonate, dried and powdered, *four hundred and seventy-seven grammes*	**477 Gm.**
Tartaric Acid, dried and powdered, *two hundred and fifty-two grammes*	**252 Gm.**
Citric Acid, uneffloresced crystals, *one hundred and sixty-two grammes*	**162 Gm.**
To make about *one thousand grammes*	**1000 Gm.**

If the aqueous solution of the salt (1 in 20) be acidulated with hydrochloric acid and filtered, the filtrate should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of dry Sodium Salicylate be thoroughly ignited at a red heat, and the residue extracted with boiling distilled water until the washings cease to react with methyl-orange T.S., the mixed filtrate and washings should require for complete neutralization not less than 12.5 (12.52) Cc. of half-normal sulphuric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.—1 Gm. (15 grains).

SODII SULPHAS

Sodium Sulphate

$Na_2SO_4 + 10H_2O = 319.91$

It should contain, in an uneffloresced condition, not less than 99 percent. of pure Sodium Sulphate [$SO_2(ONa)_2 + 10H_2O$], and should be kept in well-closed vessels, in a cool place.

Large, colorless, transparent, monoclinic prisms, or granular crystals; odorless, and having a bitter, saline taste. The salt effloresces rapidly in the air, and finally loses all of its water of crystallization.

Soluble in 2.8 parts of water at 15° C. (59° F.), in 0.25 part at 34° C. (93.2° F.), and in 0.47 part at 100° C. (212° F.); insoluble in alcohol; soluble in glycerin.

When heated to 33° C. (91.4° F.), the salt fuses, and, on continuing the heat to 100° C. (212° F.), it loses all of its water of crystallization (55.9 percent.). At a red heat the anhydrous salt fuses without decomposition. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution is neutral to litmus paper.

An aqueous solution of Sodium Sulphate (1 in 20) yields, with barium chloride T.S., a white precipitate insoluble in hydrochloric acid.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.—16 Gm. (240 grains).

SODII SULPHIS

Sodium Sulphite

$Na_2SO_3 + 7H_2O = 250.39$

It should contain, in the uneffloresced and air-dried condition, not less than 94 percent. of pure Sodium Sulphite, and should be kept in well-stoppered bottles, in a cool place.

Colorless, transparent, monoclinic prisms; odorless, and having a cooling, saline, sulphurous taste. Exposed to the air, the salt effloresces, and is slowly oxidized to sulphate.

Soluble in 2 parts of water at 25° C. (77° F.), and in 1.4 parts of boiling water; sparingly soluble in alcohol.

When gently heated, the salt softens somewhat, but it does not fuse. Above 100° C. (212° F.) the crystals lose all their water (50 percent.), without fusing forming a transparent liquid, which, on cooling, solidifies to a crystalline mass. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution is feebly alkaline to red litmus and to phenolphthalein paper.

An aqueous solution of the salt (1 in 20) yields with magnesia mixture a white precipitate; with silver nitrate T.S. it yields a white precipitate (distinction from *orthophosphate*); this precipitate is soluble in ammonia water and also in nitric acid without effervescence (absence of *carbonate*).

With an excess of ammonium molybdate T.S. no precipitate is formed within fifteen or twenty minutes, even when a gentle heat is applied (distinction from *orthophosphate*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Five cubic centimeters of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.— 2 Gm. (30 grains).

SODII SALICYLAS

Sodium Salicylate

$NaC_7H_5O_3 = 158.89$

It should contain not less than 99.5 percent. of pure Sodium Salicylate [$C_6H_4(OH)COONa$], and should be kept in well-stoppered bottles, protected from heat and light.

White, microcrystalline powder or scales, or an amorphous, colorless powder, or having not more than a faint pink tinge; odorless, and having a sweetish, saline taste.

Soluble in 0.8 part of water, and in 5.5 parts of alcohol at 25° C. (77° F.); very soluble in boiling water or alcohol; also soluble in glycerin.

When heated, the salt is decomposed, giving off inflammable vapors and an odor of phenol, and finally leaves a residue of sodium carbonate. To a non-luminous flame it imparts an intense yellow color.

An aqueous solution of Sodium Salicylate, when freshly made, should be colorless, and should slightly redden blue litmus paper.

Ferric chloride T.S., added to an excess of a concentrated solution of the salt, produces a violet precipitate; but when added to a dilute solution (1 in 100), it produces a deep violet-blue color.

If copper sulphate T.S. be added to the aqueous solution (1 in 20), a green color is produced.

On adding to about 0.2 Gm. of the salt, in a test-tube, about 1 Cc. of concentrated sulphuric acid, and then, cautiously, drop by drop, about 1 Cc. of methyl alcohol, and heating the mixture to boiling, methyl salicylate will be evolved, recognizable by its odor.

Diluted hydrochloric or sulphuric acid produces in a concentrated aqueous solution of the salt a voluminous, white precipitate, which, after being separated by filtration, and washed, should conform to the reactions and tests given under *Acidum Salicylicum*.

If to an aqueous solution of the salt (1 in 20), 3 drops of iodine T.S. and a slight excess of hydrochloric acid be added, the filtrate from this mixture should not yield a precipitate upon the addition of barium chloride T.S. (absence of *sulphites*)

If the aqueous solution of the salt (1 in 20) be acidulated with hydrochloric acid and filtered, the filtrate should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. of dry Sodium Salicylate be thoroughly ignited at a red heat, and the residue extracted with boiling distilled water until the washings cease to react with methyl-orange T.S., the mixed filtrate and washings should require for complete neutralization not less than 12.5 (12.52) Cc. of half-normal sulphuric acid V.S., methyl-orange T.S. being used as indicator.

Average dose.—1 Gm. (15 grains).

SODII SULPHAS

Sodium Sulphate

$Na_2SO_4 + 10H_2O = 319.91$

It should contain, in an uneffloresced condition, not less than 99 percent. of pure Sodium Sulphate [$SO_2(ONa)_2 + 10H_2O$], and should be kept in well-closed vessels, in a cool place.

Large, colorless, transparent, monoclinic prisms, or granular crystals; odorless, and having a bitter, saline taste. The salt effloresces rapidly in the air, and finally loses all of its water of crystallization.

Soluble in 2.8 parts of water at 15° C. (59° F.), in 0.25 part at 34° C. (93.2° F.), and in 0.47 part at 100° C. (212° F.); insoluble in alcohol; soluble in glycerin.

When heated to 33° C. (91.4° F.), the salt fuses, and, on continuing the heat to 100° C. (212° F.), it loses all of its water of crystallization (55.9 percent.). At a red heat the anhydrous salt fuses without decomposition. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution is neutral to litmus paper.

An aqueous solution of Sodium Sulphate (1 in 20) yields, with barium chloride T.S., a white precipitate insoluble in hydrochloric acid.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.—16 Gm. (240 grains).

SODII SULPHIS

Sodium Sulphite

$Na_2SO_3 + 7H_2O = 250.39$

It should contain, in the uneffloresced and air-dried condition, not less than 94 percent. of pure Sodium Sulphite, and should be kept in well-stoppered bottles, in a cool place.

Colorless, transparent, monoclinic prisms; odorless, and having a cooling, saline, sulphurous taste. Exposed to the air, the salt effloresces, and is slowly oxidized to sulphate.

Soluble in 2 parts of water at 25° C. (77° F.), and in 1.4 parts of boiling water; sparingly soluble in alcohol.

When gently heated, the salt softens somewhat, but it does not fuse. Above 100° C. (212° F.) the crystals lose all their water (50 percent.), without fusing or changing their shape. At a red heat the salt fuses to a reddish-yellow mass of sodium sulphate and sodium sulphide. To a non-luminous flame the salt imparts an intense yellow color.

Its aqueous solution is neutral or feebly alkaline to litmus paper.

Upon the addition of hydrochloric acid to the salt, sulphur dioxide gas is liberated, which is recognized by its odor, and by its blackening a strip of paper moistened with mercurous nitrate T.S. and held in the escaping gas.

If 1 Gm. of the salt be dissolved in 10 Cc. of diluted nitric acid, and the solution heated sufficiently to expel the gases, the liquid should not become turbid (absence of *thiosulphate*).

If 1 Gm. of the salt be dissolved in 20 Cc. of diluted hydrochloric acid and heated sufficiently to expel the sulphur dioxide, the remaining solution, after being restored to its original volume, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If to 50 Cc. of tenth-normal iodine V.S., measured from a burette into a glass-stoppered vial (of about 100 Cc. capacity), 0.5 Gm. of the finely powdered crystals of Sodium Sulphite be added, and after solution has taken place, not more than 12.45 Cc. of tenth-normal sodium thiosulphate V.S. should be required to discharge the color of the solution.

Average dose.— 1 Gm. (15 grains).

SODII THIOSULPHAS

Sodium Thiosulphate

$Na_2S_2O_3 + 5H_2O = 246.46$

[SODII HYPOSULPHIS, PHARM. 1890]

It should contain not less than 98 percent. of pure Sodium Thiosulphate, and should be kept in well-stoppered bottles.

Colorless, transparent, monoclinic prisms; odorless, and having a cooling, afterwards bitter taste. Permanent in the air below 33° C. (91.4° F.), but efflorescent in dry air above that temperature; slightly deliquescent in moist air.

Soluble in about 0.35 part of water at 25° C. (77° F.); at a boiling heat the solution is rapidly decomposed; insoluble in alcohol; slightly soluble in oil of turpentine.

When rapidly heated to 50° C. (122° F.), the salt melts. When slowly heated until it is effloresced, and afterwards to 100° C. (212° F.), it loses all of its water of crystallization (36.3 percent.), and at a red heat is decomposed, sulphur being liberated, while a residue of sodium sulphide and sodium sulphate remains. To a non-luminous flame it imparts an intense yellow color.

Its aqueous solution is neutral or faintly alkaline to litmus paper.

An aqueous solution of Sodium Thiosulphate readily dissolves many salts of silver (chloride, bromide, iodide, oxide, etc.), and discharges the color of a solution of iodine or of starch iodide.

If ferric chloride T.S. be dropped into the aqueous solution (1 in 20), a dark violet color will be produced, which disappears rapidly on agitation.

Addition of sulphuric or hydrochloric acid to the aqueous solution liberates from it sulphur dioxide (recognized by its odor, and by its blackening a strip of paper moistened with mercurous nitrate T.S. held in the escaping gas); a white precipitate of sulphur is also formed (distinction from *sulphite* or *bisulphite*).

If to 5 Cc. of an aqueous solution of the salt (1 in 10), 3 Cc. of nitric acid be added, the solution cautiously evaporated to dryness on a water-bath, and the residue treated with distilled water, the liquid filtered, and the filtrate and

Mix the Sulphuric Acid with *one hundred and twenty cubic centimeters* of Water, cool the liquid, add *eighty-five cubic centimeters* of Alcohol previously diluted with an equal volume of Water, and introduce the solution into a 1000 Cc. flask, surrounded by a mixture of ice and water. Dissolve the Sodium Nitrite in *two hundred and eighty cubic centimeters* of Water, filter, and, having poured the filtrate into a separatory funnel, allow the liquid to slowly drop into the flask containing the acid mixture. When all has been added and the reaction is complete, allow any crystals which may have formed to settle at the bottom of the flask, and decant the cold mixture of ethyl nitrite and aqueous solution quickly to the previously cleaned separatory funnel, and draw off and discard the aqueous liquid. Wash the separated ethyl nitrite, first, with *twenty cubic centimeters* of ice-cold Water, and then remove any traces of acid by washing it with *fifteen cubic centimeters* of ice-cold Water, in which the Monohydrated Sodium Carbonate has previously been dissolved. Carefully separate the ethyl nitrite from the aqueous liquid, and agitate it in a well-stoppered vial with the Potassium Carbonate to remove traces of water. Then cool the liquid, decant, and pour the ethyl nitrite immediately into a tared bottle containing *five hundred grammes* of Alcohol. Ascertain the weight of the ethyl nitrite poured into the Alcohol by noting the increase in weight of the tared bottle and contents, and then add enough Alcohol to make the mixture weigh *twenty-two times* the weight of the ethyl nitrite added. Lastly, transfer the product to small, well-stoppered, dark amber-colored vials, and keep these in a cool place, remote from lights or fire.

A clear, mobile, volatile, and inflammable liquid of a pale yellowish or faintly greenish-yellow tint, having a fragrant, ethereal, and pungent odor free from acridity, and a sharp, burning taste.

Specific gravity: about 0.823 at 25° C. (77° F.).

When freshly prepared, or even after being kept for some time with but little exposure to light and air, it is neutral to litmus paper. When long kept, or after having been freely exposed to air and light, it acquires an acid reaction, but it should not effervesce when a crystal of potassium bicarbonate is dropped into it.

If a test-tube be half filled with the Spirit, and put into a water-bath heated to 65° C. (149° F.) until it has acquired this temperature, the Spirit should boil distinctly upon the addition of a few small pieces of broken glass.

If 10 Cc. of the Spirit be mixed with 5 Cc. of potassium hydroxide T.S., previously diluted with 5 Cc. of water, the mixture will assume a yellow color which should not turn decidedly brown within twelve hours (limit of *aldehyde*).

Assay for Ethyl Nitrite

Transfer about 30 Gm. of the Spirit of Nitrous Ether, which has been previously shaken with 0.5 Gm. of potassium bicarbonate, to a tared 100 Cc. measuring flask, and weigh it accurately. Add sufficient alcohol to bring the volume to exactly 100 Cc., and mix thoroughly. Introduce into a nitrometer (see Appendix, Gasometric Estimations) exactly 10 Cc. of the alcoholic solution, followed by 10 Cc. of potassium iodide T.S., and afterwards by 10 Cc. of normal sulphuric acid V.S. When the volume of gas has become constant (within 30 to 60 minutes), note the volume of gas collected. Multiply this volume in Cc. by 0.307, and divide the product by one-tenth of the weight of the Spirit of Nitrous Ether taken. At standard temperature and pressure, the quotient will represent the percentage of ethyl nitrite in the liquid. The temperature correction is one-third of one percent. of the total percentage just found for each degree, additive if temperature is below, subtractive if above, 25° C. (77° F.). The barometric correction is four-thirtieths of one percent. for each millimeter, additive if above, subtractive if below, 760.

When assayed according to the above method, Spirit of Nitrous Ether should yield not less than 4 percent. of ethyl nitrite.

Average dose.— 2 Cc. (30 minims).

SPIRITUS AMMONIÆ

Spirit of Ammonia

An alcoholic solution of Ammonia [$NH_3 = 16.93$] containing 10 percent., by weight, of the gas. This solution deteriorates on keeping, and should be tested frequently. It must not be dispensed for medicinal purposes if it contains less than 10 percent. of gaseous Ammonia.

Stronger Ammonia Water, *two hundred and fifty cubic centimeters*	**250 Cc.**
Alcohol, recently distilled, and after distillation kept in glass vessels, *a sufficient quantity.*	

Pour the Stronger Ammonia Water into a flask provided with a safety funnel, and connected, by means of a glass condenser, with a well-cooled receiver containing *five hundred cubic centimeters* of Alcohol, the delivery tube of the condenser reaching nearly to the bottom of the receiver. Heat the flask carefully, and very gradually, to a temperature not exceeding 60° C. (140° F.), and maintain it at that temperature until Ammonia ceases to be evolved. Then disconnect the receiver, and, having ascertained the strength of a portion of the contents by the method of assay given below, add enough Alcohol to make the product contain *ten percent.*, by weight, of Ammonia gas. Keep the Spirit in glass-stoppered bottles, in a cool place.

A colorless liquid, having a strong odor of ammonia, and a specific gravity of about 0.808 at 25° C. (77° F.).

When diluted with water, it should respond to the tests for identity and purity given under *Aqua Ammoniæ.*

Assay

Introduce into a weighing bottle about 2 Cc. of the Spirit, weigh accurately, dilute with 50 Cc. of distilled water, and titrate with half-normal sulphuric acid V.S., using litmus T.S. as indicator. Multiply the number of Cc. of half-normal sulphuric acid V.S. consumed, by 0.008465, and this product by 100, and divide by the weight in grammes of the Spirit taken to obtain the percentage of ammonia gas.

Average dose.— 1 Cc. (15 minims).

SPIRITUS AMMONIÆ AROMATICUS

Aromatic Spirit of Ammonia

Ammonium Carbonate, in translucent pieces, *thirty-four grammes*	34 Gm.
Ammonia Water, *ninety cubic centimeters*	90 Cc.
Oil of Lemon, *ten cubic centimeters*	10 Cc.
Oil of Lavender Flowers, *one cubic centimeter*	1 Cc.
Oil of Myristica, *one cubic centimeter*	1 Cc.
Alcohol, *seven hundred cubic centimeters*	700 Cc.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

To the Ammonia Water, contained in a flask, add *one hundred and forty cubic centimeters* of Distilled Water, and afterwards the Ammonium Carbonate reduced to a moderately fine powder. Close the flask and agitate the contents until the Ammonium Carbonate is dissolved and allow it to stand for twelve hours. Introduce the Alcohol into a graduated bottle of suitable capacity, add first the Oils, then gradually the solution of Ammonium Carbonate, and afterwards enough Distilled Water to make the product measure *one thousand cubic centimeters.* Set the liquid aside during twenty-four hours in a cool place, occasionally agitating, then filter it through paper, in a well-covered funnel.

Keep the product in glass-stoppered bottles, in a cool place.

A nearly colorless liquid when freshly prepared, but gradually acquiring a somewhat darker tint.

It has the pungent odor and taste of ammonia.

Specific gravity: about 0.900 at 25° C. (77° F.).

Average dose.— 2 Cc. (30 minims).

SPIRITUS AMYGDALÆ AMARÆ

Spirit of Bitter Almond

Oil of Bitter Almond, *ten cubic centimeters*	10 Cc.
Alcohol, *eight hundred cubic centimeters*	800 Cc.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Dissolve the Oil in the Alcohol, and add enough Distilled Water to make the product measure *one thousand cubic centimeters.*

Average dose.— 0.5 Cc. (8 minims).

SPIRITUS ANISI

Spirit of Anise

Oil of Anise, *one hundred cubic centimeters*	100 Cc.
Alcohol, *nine hundred cubic centimeters*	900 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them.

Average dose.—4 Cc. (1 fluidrachm).

SPIRITUS AURANTII COMPOSITUS

Compound Spirit of Orange

Oil of Orange Peel, *two hundred cubic centimeters*	200 Cc.
Oil of Lemon, *fifty cubic centimeters*	50 Cc.
Oil of Coriander, *twenty cubic centimeters*	20 Cc.
Oil of Anise, *five cubic centimeters*	5 Cc.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix them. Keep the product in completely filled, well-stoppered bottles, in a cool and dark place.

SPIRITUS CAMPHORÆ

Spirit of Camphor

Camphor, *one hundred grammes*	100 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Dissolve the Camphor in *eight hundred cubic centimeters* of Alcohol, filter through paper, and pass enough Alcohol through the filter to make the product measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

SPIRITUS CHLOROFORMI

Spirit of Chloroform

Chloroform, *sixty cubic centimeters*	60 Cc.
Alcohol, *nine hundred and forty cubic centimeters*	940 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them.

Average dose.—2 Cc. (30 minims).

SPIRITUS CINNAMOMI

Spirit of Cinnamon

Oil of Cinnamon, *one hundred cubic centimeters*	**100 Cc.**
Alcohol, *nine hundred cubic centimeters* .	**900 Cc.**
To make *one thousand cubic centimeters* . .	**1000 Cc.**

Mix them.

Average dose.—2 Cc. (30 minims).

SPIRITUS FRUMENTI

Whisky

An alcoholic liquid obtained by the distillation of the fermented mash of grain—such as Indian corn, rye, wheat, and barley, or their mixtures.

An amber-colored liquid, having a distinctive odor and taste, and a slightly acid reaction.

Whisky should be at least four years old.

Its specific gravity should not be more than 0.945, nor less than 0.924 at 15.6° C. (60° F.), corresponding, approximately, to an alcoholic strength of 37 to 47.5 percent, by weight, or 44 to 55 percent, by volume, of absolute alcohol (see Appendix, Alcohol Tables, page [illegible]).

If 100 Cc. of Whisky be very slowly evaporated in a tared dish on a water-bath, the last portions volatilized should not have a harsh or disagreeable odor (*absence of more than a trace of fusel oil from grain*); and the residue, when dried at 100° C. (212° F.), should not weigh more than 0.5 Gm. This residue should have no sweet or distinctly spicy taste (*absence of added sugar, glycerin, and aromatic substances*), and it should almost completely dissolve in 10 Cc. of cold water, forming a solution which is colored not deeper than light green by a few drops of ferric chloride T.S. diluted with 10 volumes of water (*absence of more than traces of oak tannin from casks*).

If 50 Cc. of Whisky be shaken vigorously in a stoppered flask with 25 Gm. of kaolin, and, after standing half an hour, be filtered, the color of the filtrate should not be much lighter than that of the Whisky before treatment.

To render 100 Cc. of Whisky distinctly alkaline to litmus, not more than 1.2 Cc. of normal potassium hydroxide V.S. should be required (*limit of free acid*).

SPIRITUS GAULTHERIÆ

Spirit of Gaultheria

Oil of Gaultheria, *fifty cubic centimeters*	**50 Cc.**
Alcohol, *nine hundred and fifty cubic centimeters*	**950 Cc.**
To make *one thousand cubic centimeters* . .	**1000 Cc.**

Mix them.

Average dose.—2 Cc. (30 minims).

SPIRITUS GLYCERYLIS NITRATIS

Spirit of Glyceryl Trinitrate Spirit of Nitroglycerin

[SPIRITUS GLONOINI, PHARM. 1890]

An alcoholic solution containing 1 percent., by weight, of Glyceryl Trinitrate [$C_3H_5(O.NO_2)_3 = 225.44$]. Spirit of Nitroglycerin should be kept and transported in well-stoppered tin cans, and should be stored in a cool place, remote from lights or fire.

Great care should be exercised in dispensing, handling, packing, transporting, and storing the Spirit, since a dangerous explosion may result if any considerable quantity of it be spilled, and the alcohol be partly or wholly lost by evaporation. If, through accident, it be spilled, a solution of potassium hydroxide should be at once poured over it, to effect decomposition.

A clear, colorless liquid, having the odor and taste of alcohol. *Caution should be exercised in tasting it,* since even a small quantity of it is liable to produce a violent headache. The same effect is produced when it is freely applied to the skin.

It is neutral to litmus paper.

Specific gravity: 0.814 to 0.820 at 25° C. (77° F.).

On diluting 10 Cc. of the Spirit with 15 Cc. of water—both liquids, as well as the mixture, being brought to 15° C. (59° F.)—the liquid will exhibit at most a faint cloudiness, but the addition of a further portion of 5 Cc. of water should produce a white turbidity.

If the specific gravity of the Spirit be higher than 0.830 at 25° C. (77° F.), or if 10 Cc. of it be rendered turbid by less than 10 Cc. of water, the Spirit should be rejected.

Average dose.—0.05 Cc. (1 minim).

SPIRITUS JUNIPERI

Spirit of Juniper

Oil of Juniper, *fifty cubic centimeters*	50 Cc.
Alcohol, *nine hundred and fifty cubic centimeters*	950 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them.

Average dose.—2 Cc. (30 minims).

SPIRITUS JUNIPERI COMPOSITUS

Compound Spirit of Juniper

Oil of Juniper, *eight cubic centimeters*	8 Cc.
Oil of Caraway, *one cubic centimeter*	1 Cc.
Oil of Fennel, *one cubic centimeter*	1 Cc.
Alcohol, *fourteen hundred cubic centimeters*	1400 Cc.
Water, *a sufficient quantity,*	
To make *two thousand cubic centimeters*	2000 Cc.

Dissolve the Oils in the Alcohol, and gradually add enough Water to make the product measure *two thousand cubic centimeters.*

Average dose.—8 Cc. (2 fluidrachms).

SPIRITUS LAVANDULÆ

Spirit of Lavender

Oil of Lavender Flowers, *fifty cubic centimeters*	50 Cc.
Alcohol, *nine hundred and fifty cubic centimeters*	950 Cc.
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix them.

Average dose.—2 Cc. (30 minims).

SPIRITUS MENTHÆ PIPERITÆ

Spirit of Peppermint

Oil of Peppermint, *one hundred cubic centimeters*	100 Cc.
Peppermint, bruised, *ten grammes*	10 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Oil of Peppermint in *nine hundred cubic centimeters* of Alcohol, add the Peppermint, and allow it to macerate for twenty-four hours. Then filter through paper, and add, through the filter, enough Alcohol to make the Spirit measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

SPIRITUS MENTHÆ VIRIDIS

Spirit of Spearmint

Oil of Spearmint, *one hundred cubic centimeters*	100 Cc.
Spearmint, bruised, *ten grammes*	10 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Oil of Spearmint in *nine hundred cubic centimeters* of Alcohol, add the Spearmint, and allow it to macerate for twenty-four hours. Then filter through paper, and add, through the filter, enough Alcohol to make the Spirit measure *one thousand cubic centimeters.*

Average dose.—2 Cc. (30 minims).

SPIRITUS VINI GALLICI

Brandy

An alcoholic liquid obtained by the distillation of the fermented, unmodified juice of fresh grapes.

A pale amber-colored liquid, having a distinctive odor and taste, and a slightly acid reaction.

Brandy should be at least four years old.

Its specific gravity should be not more than 0.941, nor less than 0.925 at 15.6° C. (60° F.), corresponding, approximately, to an alcoholic strength of 39 to 47 percent. by weight, or 46 to 55 percent. by volume, of absolute alcohol (see Appendix, Alcohol Tables, page 604).

If 100 Cc. of Brandy be slowly evaporated in a tared dish on a water-bath, the last portions volatilized should have an agreeable odor free from harshness (absence of *fusel oil* from grain or potato spirit); and the residue, when dried at 100° C. (212° F.), should not weigh more than 0.5 Gm. This residue should have no sweet or distinctly spicy taste (absence of *added sugar*, *glycerin*, and *aromatic substances*), and it should almost completely dissolve in 10 Cc. of cold water, forming a solution which is colored not deeper than light green by a few drops of ferric chloride T.S. diluted with 10 volumes of water (absence of more than traces of *oak tannin* from casks).

To render 100 Cc. of Brandy distinctly alkaline to litmus, not more than 1 Cc. of normal potassium hydroxide V.S. should be required (limit of *free acid*).

STAPHISAGRIA

Staphisagria

The ripe seed of *Delphinium Staphisagria* Linné (Fam. *Ranunculaceæ*).

Irregularly tetrahedral, one side convex, 5 to 6 Mm. long and 3 to 6 Mm. broad; externally blackish-brown, becoming lighter with age, strongly reticulate; endosperm oily, enclosing a small, straight embryo; odor slight; taste intensely bitter and acrid.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

STILLINGIA

Stillingia

The dried root of *Stillingia sylvatica* Linné (Fam. *Euphorbiaceæ*).

Slenderly fusiform, usually in cut pieces, of variable length and 0.5 to 3 Cm. in diameter; externally reddish-brown, longitudinally wrinkled; fracture fibrous, bark light reddish-brown, 0.5 to 4 Mm. thick, spongy, finely fibrous, with numerous resin cells, easily separable from the porous, radiate wood; odor distinct; taste bitter, acrid, and pungent.

Average dose.— 2 Gm. (30 grains).

STRAMONIUM

Stramonium

[STRAMONII FOLIA, PHARM. 1890]

The dried leaves of *Datura Stramonium* Linné (Fam. *Solanaceæ*), yielding, when assayed as directed below, not less than 0.25 percent. of mydriatic alkaloids.

Usually of a dark green or grayish-green color, much wrinkled and matted together; petiolate, 6 to 20 Cm. long, inequilaterally ovate, acuminate, very oblique at the base, the large teeth few, acute, with rounded sinuses; thin, brittle; odor distinct, heavy, and narcotic; taste nauseous.

The powder contains few hairs and has numerous rosette-shaped calcium oxalate crystals from 0.010 to 0.020 Mm. in diameter.

Assay of Stramonium

The method to be employed is identical with that given on page 67 for Belladonna Leaves, using *ten grammes* of Stramonium, in No. 60 powder.

Average dose.— 0.065 Gm. = 65 milligrammes (1 grain).

STRONTII BROMIDUM

Strontium Bromide

$SrBr_2 + 6H_2O = 352.94$

It should contain not less than 97 percent. of pure Strontium Bromide, and should be kept in glass-stoppered bottles.

Colorless, transparent, hexagonal crystals; odorless, and having a bitter, saline taste. Very deliquescent and also occasionally efflorescent.

Soluble in about 1 part of water at 25° C. (77° F.), and in 0.4 part of boiling water. It is readily soluble in alcohol, and is precipitated from this solution upon the addition of an equal volume of ether, in which it is insoluble.

When heated, the crystals at first melt, and then lose all their water (30.4 percent.). The anhydrous salt fuses at 630° C. (1166° F.).

To a non-luminous flame the salt communicates an intense red color.

Its aqueous solution is neutral to litmus paper.

With calcium sulphate T.S. the aqueous solution (1 in 20) slowly forms a white precipitate of strontium sulphate, insoluble in dilute acids; the same reaction occurs more quickly with diluted sulphuric acid and the readily soluble sulphates.

With potassium chromate T.S. it forms a yellow precipitate of strontium chromate, soluble in acetic acid.

With ammonium carbonate T.S., or sodium carbonate T.S., it forms a white precipitate of strontium carbonate, soluble, with effervescence, in acetic acid.

If to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform be added, and then chlorine water, which has been diluted with an equal volume of water, introduced cautiously, drop by drop, with constant agitation, the liberated bromine will dissolve in the chloroform, imparting to it a yellow to orange color, free from any violet tint (absence of *iodide*).

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. each of Strontium Bromide and sodium acetate be dissolved in 5 Cc. of distilled water, and the solution made slightly acid by the addition of from 3 to 5 drops, or a sufficient quantity, of diluted acetic acid, the solution should not, upon the addition of 5 drops of potassium dichromate T.S. and agitating, become cloudy within three minutes (limit of *barium*).

If 0.5 Gm. of Strontium Bromide be dissolved in about 50 Cc. of distilled water, and a few drops of potassium chromate T.S. be added, it should require the addition of not less than 27.4 (27.48) Cc. nor more than 29.4 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color (corresponding to at least 97 percent. of pure Strontium Bromide).

Average dose.— 1 Gm. (15 grains).

STRONTII IODIDUM

Strontium Iodide

$SrI_2 + 6H_2O = 446.02$

It should contain not less than 98 percent. of pure Strontium Iodide, and should be kept in small, glass-stoppered vials, carefully protected from light.

Colorless, transparent, hexagonal plates or white granular powder, or crystalline crusts; odorless, and having a bitter, saline taste. Deliquescent, and colored yellow by exposure to air and light.

Soluble in about 0.5 part of water at 25° C. (77° F.), and in 0.27 part of boiling water. Also soluble in alcohol, and slightly soluble in ether.

When cautiously heated, the crystals melt and gradually lose their water (24.05 percent.), becoming anhydrous. At a red heat, the salt is decomposed, losing iodine, and leaving a residue of strontium oxide.

To a non-luminous flame it imparts an intense red color.

Its aqueous solution is neutral, or very slightly alkaline to litmus paper.

With calcium sulphate T.S. it slowly forms a white precipitate of strontium sulphate, insoluble in diluted acids; the same reaction occurs more quickly with diluted sulphuric acid and the readily soluble sulphates.

With potassium chromate T.S. it forms a yellow precipitate of strontium chromate, soluble in acetic acid.

With ammonium carbonate T.S., or sodium carbonate T.S., it forms a white precipitate of strontium carbonate, soluble, with effervescence, in acetic acid.

If to 5 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chlorine water be added, iodine will be liberated, and impart to the solution a light reddish-brown color; on agitating the mixture with a few drops of chloroform, the latter will acquire a violet color.

The aqueous solution of the salt (1 in 20), slightly acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 1 Gm. each of Strontium Iodide and sodium acetate be dissolved in 5 Cc. of distilled water, and the solution be made slightly acid by the addition of from 3 to 5 drops, or a sufficient quantity, of diluted acetic acid, the solution should not, upon the addition of 5 drops of potassium dichromate T.S., and agitating, become cloudy within three minutes (limit of *barium*).

If 0.5 Gm. of Strontium Iodide be dissolved in about 100 Cc. of distilled water contained in a flask, and 25 Cc. of tenth-normal silver nitrate V.S., 5 Cc.

of nitric acid, and 5 Cc. of ferric ammonium sulphate T.S. be successively added, the flask stoppered and thoroughly shaken, then the addition of not less than 1.7 Cc. nor more than 3.1 Cc. of tenth-normal potassium sulphocyanate V.S. should be required to produce a permanent red tint (corresponding to 98 percent. of pure Strontium Iodide).

Average dose.—0.500 Gm. = 500 milligrammes ($7\frac{1}{2}$ grains).

STRONTII SALICYLAS

Strontium Salicylate

$Sr(C_7H_5O_3)_2 + 2H_2O = 394.72$

It should contain not less than 98.5 percent. of pure Strontium Salicylate $[(C_6H_4.OH.COO)_2Sr + 2H_2O]$, and should be kept in well-stoppered bottles, protected from heat and light.

A white, crystalline powder; odorless, and having a sweetish, saline taste.

Soluble in 18 parts of water and in 66 parts of alcohol at 25° C. (77° F.), in 3.5 parts of boiling water, and in 10.5 parts of boiling alcohol.

When heated, the salt is decomposed, giving off inflammable vapors and an odor of phenol, and finally leaving a gray residue of strontium carbonate.

To a non-luminous flame its solution imparts an intense red color.

Its aqueous solution should be colorless, and slightly alkaline to litmus paper.

Ferric chloride T.S., when added to an excess of a concentrated aqueous solution of the salt, produces a violet precipitate; but when added to a very dilute solution (1 in 100), it produces a deep violet-blue color.

If copper sulphate T.S. be added to the aqueous solution (1 in 20), a green color will be produced.

On adding about 1 Cc. of concentrated sulphuric acid to about 0.2 Gm. of the salt, in a test-tube, then about 1 Cc. of methyl alcohol, in drops, and heating the mixture to boiling, the odor of methyl salicylate will be evolved.

With calcium sulphate T.S., the aqueous solution of the salt (1 in 20) slowly forms a white precipitate of strontium sulphate, insoluble in dilute acids; the same reaction occurs more quickly with diluted sulphuric acid or a readily soluble sulphate.

With potassium chromate T.S., Strontium Salicylate forms a yellow precipitate of strontium chromate, soluble in acetic acid.

With ammonium carbonate T.S., or sodium carbonate T.S., the salt forms a white precipitate of strontium carbonate, soluble, with effervescence, in acetic acid.

If to the aqueous solution of Strontium Salicylate (1 in 20) 5 drops of hydrochloric acid be added, and the mixture agitated and filtered, the filtrate should not respond to the Time-Limit Test for *heavy metals* (see Appendix, Test No. 121).

If 2 Gm. of Strontium Salicylate be agitated with 10 Cc. of diluted acetic acid, heated, cooled, and filtered, the filtrate, upon the addition of 5 drops of potassium dichromate T.S., should not become cloudy within three minutes (limit of *barium*).

If to 0.5 Gm. of Strontium Salicylate, contained in a porcelain crucible, 1 Cc. of sulphuric acid be added, the mixture cautiously heated until no more vapors are given off, the residue again moistened with a few drops of the acid, again heated, and finally ignited until white and of constant weight, the residue of ontium sulphate should weigh not less than 0.227 Gm.

age dose.—1 Gm. (15 grains).

STROPHANTHINUM

Strophanthin

A glucoside, or mixture of glucosides, obtained from Strophanthus. It should be kept in well-stoppered, amber-colored vials.

A white or faintly yellowish crystalline powder, containing varying amounts of water of crystallization, which it does not lose entirely without decomposition. Taste intensely bitter; *great caution should be used in tasting it.* Permanent in the air.

It is very soluble in water and in diluted alcohol, less soluble in absolute alcohol, but nearly insoluble in ether, chloroform, and benzene.

When heated, it begins to fuse at 170° C. (338° F.), and is not completely melted until the temperature of 190° C. (374° F.) is reached.

Its solutions are dextrogyrate, and neutral to litmus paper.

Sulphuric acid produces with Strophanthin an emerald-green color, changing to brown.

If to an aqueous solution of Strophanthin a trace of ferric chloride T.S. and a few Cc. of sulphuric acid be added, a red-brown precipitate will be produced, turning dark green after one or two hours.

Strophanthin should not reduce alkaline cupric tartrate V.S.; if its solution be heated to 70° C. (158° F.) with a small amount of diluted hydrochloric acid (1 in 20), it will be decomposed into strophanthidin, which precipitates, and a sugar, which will remain in solution, and which will reduce alkaline cupric tartrate V.S.

Average dose.—0.0003 Gm. = 0.3 milligramme ($\frac{1}{200}$ grain).

STROPHANTHUS

Strophanthus

The ripe seed of *Strophanthus Kombé* Oliver (Fam. *Apocynaceæ*), deprived of its long awn.

Of a light fawn-brown color, with a distinct greenish tinge; about 15 Mm. long and 4 to 5 Mm. wide, 2 to 2.5 Mm. thick, lance-ovoid, obtuse at the base, gradually acuminate and somewhat acute at the summit, usually twisted, bearing on one side a ridge running from about the centre to the apex; silky-lustrous from a dense coating of closely appressed hairs, which mostly lie in longitudinal grooves on the surface; fracture short and somewhat soft, the fractured surface whitish and oily; kernel consisting of a thin endosperm enclosing straight cotyledons; odor slight, or heavy when the seeds are crushed and moistened; taste very bitter.

The endosperm, and often parts of the cotyledons, quickly assume a green color when crushed or cut and treated with concentrated sulphuric acid. Under the microscope the hairs are seen to be of a light greenish-brown color, 1 Mm. or less in length and to consist of but one thin-walled cell.

A decoction prepared with 1 part of the seed and 10 parts of water has a brownish color, and is not changed in appearance on the addition of iodine T.S., ferric chloride T.S., or mercuric potassium iodide T.S.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

STRYCHNINA

Strychnine

$C_{21}H_{22}N_2O_2 = 331.73$

An alkaloid obtained from Nux Vomica, and also obtainable from other plants of the *Loganiaceæ*.

Colorless, transparent, prismatic crystals, or a white crystalline powder; odorless, and having an intensely bitter taste, perceptible even in solutions of 1 in 700,000. *Strychnine should be tasted with extreme caution.* Permanent in the air.

Soluble in 6400 parts of water, 110 parts of alcohol, 5500 parts of ether, 6 parts of chloroform, 150 parts of benzene, and in 180 parts of amyl alcohol at 25° C. (77° F.); soluble in 3000 parts of water at 80° C. (176° F.), and in 28 parts of alcohol at 60° C. (140° F.).

Its melting point is 268° C. (514.4° F.). Upon ignition it is consumed, leaving no residue.

Its solutions are lævogyrate and alkaline to litmus paper.

Sulphuric acid containing 1 percent. of ammonium vanadate produces with Strychnine a deep violet-blue color, changing to a deep purple, and finally to a cherry-red. Sulphuric acid containing a trace of potassium iodate produces a violet color, changing momentarily to reddish-purple.

If 0.1 Gm. of Strychnine dissolved in a few drops of nitric acid be evaporated to dryness, and a few drops of ammonia water added to the yellow residue, an orange color will be produced, which will turn reddish-purple, and finally brown, on the addition of a small amount of alcoholic potassium hydroxide T.S.

Sulphuric acid should produce no color (absence of *sugar* and *other readily carbonizable organic impurities*), but on adding a fragment of potassium dichromate, a deep blue color is momentarily produced, changing to deep violet, then to purplish-red, cherry-red, and finally to orange or yellow.

Nitric acid, when added to a crystal of Strychnine on a white porcelain surface, may produce a yellow but not a red or reddish color (limit of *brucine*).

Average dose.—0.001 Gm. = 1 milligramme ($\frac{1}{64}$ grain).

STRYCHNINÆ NITRAS

Strychnine Nitrate

$C_{21}H_{22}N_2O_2.HNO_3 = 394.30$

The nitrate [$NO_2OH.C_{21}H_{22}N_2O_2$] of the alkaloid Strychnine. It should be kept in well-stoppered vials.

Colorless, glistening needles; odorless, and having an intensely bitter taste. *Strychnine Nitrate should be tasted with extreme caution.* Permanent in the air.

Soluble in 42 parts of water, 120 parts of alcohol, 156 parts of chloroform, and in 60 parts of glycerin at 25° C. (77° F.); soluble in 8 parts of water at 80° C. (176° F.), and in 60 parts of alcohol at 60° C. (140° F.); insoluble in ether.

When heated, the salt decomposes, but it does not melt, and when ignited it is consumed without leaving a residue.

Its aqueous solutions are neutral to litmus paper, and lævogyrate.

A solution of the salt, when poured carefully into a test-tube upon a layer of sulphuric acid containing in solution a little diphenylamine, will develop a blue zone at the juncture of the two liquids.

On being heated with hydrochloric acid a bright red color is formed.

Sulphuric acid containing 1 percent. of ammonium vanadate produces with Strychnine Nitrate a dark violet-blue color, changing to purple, and then to red. Sulphuric acid containing a trace of potassium dichromate produces momentarily a blue color, changing to violet, then to purplish-red, cherry-red, and finally to orange or yellow.

If 0.1 Gm. of the salt, dissolved in a few drops of nitric acid, be evaporated to dryness, and a few drops of ammonia water added to the residue, an orange color will be produced, which will turn reddish-purple, and finally brown, on the addition of a small amount of alcoholic potassium hydroxide T.S.

The addition of sulphuric acid to a crystal of Strychnine Nitrate on a white porcelain surface may produce a yellow but not a red or reddish color (limit of *brucine*).

Average dose.—0.001 Gm. = 1 milligramme ($\frac{1}{64}$ grain).

STRYCHNINÆ SULPHAS

Strychnine Sulphate

$(C_{21}H_{22}N_2O_2)_2.H_2SO_4 + 5H_2O = 850.21$

The sulphate $[SO_2(OH)_2.(C_{21}H_{22}N_2O_2)_2 + 5H_2O]$ of the alkaloid strychnine. It should be kept in well-stoppered vials.

Colorless, or white prismatic crystals, or a white, crystalline powder; odorless, and having an intensely bitter taste, perceptible even in solutions of 1 in 700,000. *Strychnine Sulphate should be tasted with extreme caution.* Efflorescent in dry air.

Soluble in 31 parts of water, 65 parts of alcohol, and in 325 parts of chloroform at 25° C. (77° F.); soluble in 6 parts of water at 80° C. (176° F.), and in 20 parts of alcohol at 60° C. (140° F.); insoluble in ether.

When heated at 100° C. (212° F.), the salt loses its water of crystallization (10.59 percent.), and when anhydrous melts at 200° C. (392° F.). Upon ignition, it is consumed, leaving no residue.

Barium chloride T.S. produces in a solution of the salt a white precipitate, which is insoluble in hydrochloric acid.

Sulphuric acid should produce no color with strychnine sulphate, but on adding a fragment of potassium dichromate, a blue color should be formed, changing to deep violet, then to purplish-red, cherry-red, and finally to orange or yellow. Sulphuric acid containing 1 percent. of ammonium vanadate produces a deep violet-blue color, changing to deep purple, and finally to cherry-red. Sulphuric acid containing a trace of potassium iodate produces a violet color, changing to reddish-purple.

If 0.1 Gm. of the salt be dissolved in a few drops of nitric acid, evaporated to dryness, and a few drops of ammonia water added to the yellow residue, an orange color will be produced, which will turn momentarily reddish-purple, and finally brown, on the addition of a small amount of alcoholic potassium hydroxide T.S.

Nitric acid, when added to a crystal of Strychnine Sulphate on a white porcelain surface, may produce a yellow but not a red or reddish color (limit of *brucine*).

Average dose.—0.001 Gm. = 1 milligramme ($\frac{1}{64}$ grain).

STYRAX

Storax

A balsam obtained from the wood and inner bark of *Liquidambar orientalis* Miller (Fam. *Hamamelidaceæ*).

A semi-liquid, grayish, sticky, opaque mass, depositing, on standing, a heavy, dark brown stratum ; transparent in thin layers, and having an agreeable odor and a balsamic taste.

Insoluble in water, but completely soluble (with the exception of accidental impurities) in an equal weight of warm alcohol.

If the alcoholic solution, which has an acid reaction, be cooled, filtered, and evaporated, it should leave not less than 60 percent. of the original weight of the balsam, in the form of a brown, semi-liquid residue almost completely soluble in ether and in carbon disulphide, but partially soluble in petroleum benzin.

When heated on a water-bath, Storax becomes more fluid, and if it be then agitated with warm petroleum benzin, the supernatant liquid, on being decanted and allowed to cool, will be colorless, and will deposit white crystals of cinnamic acid and cinnamic esters.

Average dose.— 1 Gm. (15 grains).

SULPHONETHYLMETHANUM

Sulphonethylmethane

$C_8H_{18}S_2O_4 = 240.46$

Diethylsulphonemethylethylmethane [$(CH_3)(C_2H_5)C(SO_2C_2H_5)_2$], a product of the oxidation of the mercaptol obtained by the condensation of methylethylketone with ethylmercaptan. It should be preserved in well-stoppered vials.

Colorless, lustrous, odorless, crystalline scales, which have a bitter taste in aqueous solution.

Soluble in 195 parts of water at 25° C. (77° F.), more readily in boiling water, and readily soluble in alcohol and ether.

When heated to 76° C. (168.8° F.), it melts, and at a red heat is consumed, evolving sulphur dioxide and leaving no weighable residue.

Its aqueous solution is neutral to litmus paper.

If 0.1 Gm. of Sulphonethylmethane be heated with 0.1 Gm. of powdered charcoal in a dry test-tube, the characteristic unpleasant odor of mercaptan will be developed.

If 0.1 Gm. be gradually heated with dried sodium acetate, hydrogen sulphide will be evolved.

One Gm. dissolved in 50 Cc. of boiling water should develop no odor. This solution, when cooled and filtered, should show no turbidity on the addition of barium nitrate T.S. or silver nitrate T.S. (absence of *sulphates* and *chlorides*).

One drop of potassium permanganate T.S. added to the aqueous solution of Sulphonethylmethane should not be immediately decolorized (absence of *readily oxidizable organic impurities*).

Average dose.— 1 Gm. (15 grains).

SULPHONMETHANUM

Sulphonmethane

$C_7H_{16}S_2O_4 = 226.55$

Diethylsulphonedimethylmethane [$(CH_3)_2C(SO_2C_2H_5)_2$], the product of the oxidation of the mercaptol obtained by the condensation of acetone with ethylmercaptan. It should be preserved in well-stoppered vials.

Colorless, inodorous, and nearly tasteless prismatic crystals or crystalline powder.

Soluble in 360 parts of water, 47 parts of alcohol, 45 parts of ether, and in 16 parts of chloroform at 25° C. (77° F.); soluble in 15 parts of boiling water, and in 2 parts of boiling alcohol; soluble in benzene.

When heated to 125.5° C. (258° F.) it melts, and at a red heat it is consumed, evolving vapors of sulphur dioxide and leaving no weighable residue.

Its aqueous solution is neutral to litmus paper.

If 0.1 Gm. of Sulphonmethane be heated with 0.1 Gm. of powdered charcoal in a dry test-tube, the characteristic unpleasant odor of mercaptan will be developed.

If 0.1 Gm. be gradually heated with dry sodium acetate, hydrogen sulphide will be evolved.

Its solution in boiling water should develop no odor. This solution, after cooling and filtering, should show no turbidity upon the addition of either barium nitrate T.S. or silver nitrate T.S. (absence of *sulphates* and *chlorides*).

If 1 drop of potassium permanganate T.S. be added to an aqueous solution of Sulphonmethane, the liquid should not be immediately decolorized (absence of *readily oxidizable organic impurities*).

Average dose.— 1 Gm. (15 grains).

SULPHUR LOTUM

Washed Sulphur

S = 31.83

Washed sulphur, when dried, should contain not less than 99.5 percent. of pure Sulphur.

Sublimed Sulphur, *one hundred grammes*	100 Gm.
Ammonia Water, *ten cubic centimeters*	10 Cc.
Water, *a sufficient quantity.*	

Pass the Sublimed Sulphur through a No. 30 sieve, mix it thoroughly with *one hundred cubic centimeters* of Water, add the Ammonia Water, and digest for three days, agitating occasionally. Then add *one hundred cubic centimeters* of Water, transfer the mixture to a muslin strainer, and wash the Sulphur with Water until the washings cease to impart a blue color to red litmus paper. Then allow it to drain, press the residue strongly, dry it rapidly at a moderate heat, pass it through a No. 30 sieve, and keep it in well-stoppered bottles.

A fine yellow powder, without odor or taste.

Insoluble in water; readily soluble in carbon disulphide; slightly soluble in absolute alcohol; more readily soluble in petroleum benzin, benzene, oil of turpentine, and many other oils; also in ether, chloroform, and in boiling aqueous solutions of alkali hydroxides.

At about 115° C. (239° F.) it fuses to a yellow, mobile fluid, which upon further heating becomes dark and viscid, until a temperature above 300° C. (572° F.) is reached, when it becomes a thin liquid boiling at 448° C. (838.4° F.).

If air be admitted, it burns to sulphur dioxide, which is identified by its characteristic odor, and by its blackening a strip of paper moistened with mercurous nitrate T.S. held in the gas.

The amount of residue left after volatilizing or igniting a weighed portion of dried Washed Sulphur should not exceed 0.2 percent.

If 0.5 Gm. of Washed Sulphur be boiled with 10 Cc. of sodium hydroxide T.S., it should be dissolved, leaving no appreciable residue (absence of *earthy* and *metallic impurities*).

If 0.5 Gm. of Washed Sulphur be digested for several hours with 10 Cc. of ammonia water, the liquid filtered, and the clear filtrate evaporated to dryness on a water-bath, then, after adding 1 Cc. of nitric acid and again evaporating, the solution obtained by dissolving the residue in 10 Cc. of hydrochloric acid (8 percent.) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 5 Cc. of water be agitated with 2 Gm. of Washed Sulphur, the liquid should not change the color of blue or red litmus paper (absence of *acid* and of *ammonia*).

Average dose.— 4 Gm. (60 grains).

SULPHUR PRÆCIPITATUM

Precipitated Sulphur

S = 31.83

Precipitated Sulphur, when dried, should contain not less than 99.5 percent. of pure Sulphur.

Sublimed Sulphur, *one hundred grammes*	100 Gm.
Lime, *fifty grammes*	50 Gm.
Hydrochloric Acid,	
Water, each, *a sufficient quantity.*	

Slake the Lime, and mix it uniformly with *five hundred cubic centimeters* of Water. Add the Sublimed Sulphur, previously sifted, and, after thorough mixing, add *one thousand cubic centimeters* of Water, and boil the mixture in a porcelain or glass vessel during one hour, stirring or agitating very frequently, and replacing the Water lost by evaporation. Then cover the vessel, and permit the contents to cool and become clear by subsidence. Carefully draw off the clear solution, and filter the remainder. To the united liquids add gradually, and with constant stirring, Hydrochloric Acid, previously diluted with an equal volume of Water, until the liquid is nearly neutralized, still retaining, however, an alkaline reaction and a yellow color. Collect the precipitate on a strainer, and wash it, until the washings are tasteless and cease to give a precipitate upon the addition of ammonium oxalate test solution. Then dry the product rapidly, at a moderate heat, and keep it in well-stoppered bottles.

A fine, amorphous powder, of a pale yellow color, without odor or taste.

Insoluble in water; very slightly soluble in absolute alcohol; readily soluble in carbon disulphide, petroleum benzin, benzene, oil of turpentine, and many other oils; also in ether, chloroform, and in boiling aqueous solutions of alkali hydroxides.

At 115° C. (239° F.) Precipitated Sulphur melts, and at a higher temperature it volatilizes, or, if air be admitted, burns to sulphur dioxide.

If 1 Gm. of Precipitated Sulphur be ignited, it should not leave a weighable residue.

If 1 Gm. of Precipitated Sulphur be digested for several hours with 10 Cc. of ammonia water and the liquid filtered, one-half of the clear filtrate should not leave a residue on evaporation; if the remainder be evaporated to dryness on a water-bath, then, after adding 1 Cc. of nitric acid and again evaporating, the solution obtained by dissolving the residue in 10 Cc. of hydrochloric acid (8 percent.) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 5 Cc. of water be agitated with 2 Gm. of Precipitated Sulphur, the liquid should not change the color of blue or red litmus paper (absence of *acid* and *alkali*).

Average dose.— 4 Gm. (60 grains).

SULPHUR SUBLIMATUM

Sublimed Sulphur

S = 31.83

It should contain not less than 99 percent. of pure Sulphur.

A fine, yellow powder, having a slight characteristic odor, and a faintly acid taste.

Insoluble in water; readily soluble in carbon disulphide; slightly soluble in absolute alcohol; more readily soluble in petroleum benzin, benzene, oil of turpentine, and many other oils; also in ether, chloroform, and in boiling aqueous solutions of alkali hydroxides.

At about 115° C. (239° F.) it fuses to a yellow, mobile fluid, which upon further heating, becomes dark and viscid, until a temperature above 300° C. (572° F.) is reached, when it becomes a thin liquid boiling at 448° C. (838.4° F.). In the air it burns to sulphur dioxide, characterized by its odor, and by its blackening a strip of paper moistened with mercurous nitrate T.S. held in the gas.

When agitated with water, the latter gives an acid reaction with litmus paper.

The amount of residue left after volatilizing or burning a weighed portion of well-dried Sublimed Sulphur should not exceed 0.5 percent.

Average dose.— 4 Gm. (60 grains).

SULPHURIS IODIDUM

Sulphur Iodide

Washed Sulphur, *twenty grammes*	**20 Gm.**
Iodine, *eighty grammes*	**80 Gm.**

Mix the Sulphur and Iodine thoroughly by trituration; introduce the mixture into a flask, close the orifice loosely, and, by means of a water-bath, gradually and with occasional agitation apply a heat not exceeding 60° C. (140° F.), until the ingredients combine and become of a uniformly dark color throughout. Then increase the heat to the boiling point of water, so as to fuse the mass. Should any Iodine have sublimed and condensed on the glass, incline the flask so as to combine the Iodine with the fused mass, and then pour the latter upon a porcelain plate or other suitable cold surface. When it is cold, break the product into pieces of suitable size, and keep them in a glass-stoppered bottle, in a cool place.

Brittle masses of a crystalline fracture and a grayish-black, metallic lustre, having the odor of iodine and a somewhat acrid taste.

Almost insoluble in water; soluble in about 60 parts of glycerin; very soluble in carbon disulphide. Alcohol, ether, and a solution of potassium iodide dissolve the iodine, leaving the sulphur. Continued boiling with water vaporizes all of the iodine, leaving about 20 percent. of sulphur as residue.

On exposing Sulphur Iodide to the air, it gradually loses iodine. On heating it, some iodine sublimes at first; at a somewhat higher temperature a sublimate is formed, containing both iodine and sulphur. At a still higher temperature, the whole is volatilized, leaving only a trace of residue.

If 0.5 Gm. of finely pulverized Sulphur Iodide, together with 1 Gm. of potassium iodide, be dissolved in 20 Cc. of water (the sulphur separating), not less than 28 Cc. of tenth-normal sodium thiosulphate V.S. should be required for complete decolorization of the mixture, using starch T.S. as indicator.

SUMBUL

Sumbul

The dried rhizome and root of an undetermined plant, probably of the family *Umbelliferæ.*

In transverse segments, of variable length and rarely exceeding 10 Cm. in diameter; externally dusky brown, annulate, longitudinally wrinkled, or with a smooth, silver-gray periderm; fracture short-fibrous, light yellow or brownish-yellow, spongy, porous, with numerous brownish-yellow resin reservoirs, and irregular, easily separable fibres; bark about 0.5 Mm. thick; odor strong, musk-like; taste bitter.

Average dose.—2 Gm. (30 grains).

SUPPOSITORIA

Suppositories

Suppositories are solid bodies of various weights and shapes, adapted for introduction into the different orifices of the human body, and melting readily at blood heat. The vehicles usually employed are Oil of Theobroma, Glycerinated Gelatin, or Sodium Stearate.

For suppositories made with Oil of Theobroma the following general processes may be employed:

Take of

The Medicinal Substance, *the prescribed quantity.*
Oil of Theobroma, grated, *a sufficient quantity.*

Reduce the Medicinal Substance, if dry, to a very fine powder, or, if an extract, soften it with an appropriate liquid, then mix it thoroughly in a mortar with about an equal weight of grated Oil of Theobroma, and incorporate the remainder of the Oil of Theobroma until a homogeneous, plastic mass is obtained, adding, if necessary, a small quantity of Expressed Oil of Almond. Roll the mass on a graduated tile until a cylinder of the proper length is formed, divide this into the required number of equal parts, and with a spatula, or other convenient mechanical aid, form them into the desired shape.

If the process of fusion is preferred, mix the Medicinal Substance with about an equal weight of grated Oil of Theobroma, as above directed, then thoroughly incorporate it with the remainder of the Oil of Theobroma, previously melted by a gentle heat, in a suitable vessel provided with a lip; then allow it to cool to about 38° C. (100.4° F.), and, when the mixture begins to congeal, pour it immediately into suitable well-cooled moulds. Keep the moulds at a freezing temperature until the suppositories have hardened and are ready to be removed.

For suppositories containing chloral, phenol, their derivatives, or substances which soften the vehicle, raise the melting point of the Oil of Theobroma by the addition of from ten to fifteen percent. of spermaceti, but the melting point must not be raised above 37° C. (98.6° F.).

For suppositories made with Glycerinated Gelatin the following process may be used:

Take of

The Medicinal Substance, *the prescribed quantity.*
Glycerinated Gelatin,
Glycerin,
Water, each, *a sufficient quantity.*

Mix the Medicinal Substance, if solid and soluble in Water or Glycerin, or if a miscible liquid, with a little Water, and add sufficient Glycerin to make the weight of the mixture one-half that of the finished mass. Then thoroughly incorporate it with an equal weight of melted Glycerinated Gelatin, and pour it at once into suitable moulds which have been greased with a small quantity of petrolatum. Cool the moulds thoroughly before removing the suppositories.

Moulds for urethral suppositories should be warmed sufficiently before pouring the mass to facilitate the proper filling of the mould. Suppositories having a firmer consistence may be prepared by substituting Mucilage of Acacia for a portion of the Water or Glycerin.

If the Medicinal Substance be insoluble in Water or Glycerin, thoroughly levigate it in a warm mortar with a sufficient quantity of Glycerin to make the weight of the mixture one-half that of the finished mass. Then thoroughly incorporate it with an equal weight of melted Glycerinated Gelatin, and pour it into suitable moulds as above directed. With bulky powders about one-half of the Glycerin may be replaced with Water before levigation. Glycerinated Gelatin suppositories should be protected against the effects of heat and moisture and dry air by keeping them in tightly closed containers in a cool place.

Rectal Suppositories should be cone-shaped or spindle-shaped, and when made from Oil of Theobroma should weigh about *two grammes.*

Urethral Suppositories (*Bougies*) should be pencil-shaped, pointed at one extremity, and either *seven centimeters* in length, weighing about *two grammes*, or *fourteen centimeters* in length, weighing about *four grammes*, when made with Glycerinated Gelatin. If prepared with Oil of Theobroma they should weigh about one-half the above quantities.

Vaginal Suppositories should be globular or oviform in shape, and weigh about *ten grammes* if made with Glycerinated Gelatin, and about *four grammes* if made with Oil of Theobroma.

SUPPOSITORIA GLYCERINI

Suppositories of Glycerin

Glycerin, *thirty grammes*	30.0 Gm.
Monohydrated Sodium Carbonate, *one-half gramme* . . .	0.5 Gm.
Stearic Acid, *two grammes*	2.0 Gm.
Water, *five cubic centimeters*	5.0 Cc.
To make *ten rectal suppositories* . .	10

Dissolve the Monohydrated Sodium Carbonate in the Water and add it to the Glycerin, contained in a dish, on a water-bath; add the Stearic Acid, and heat the mixture carefully until carbon dioxide ceases to be evolved, and the liquid is clear. Then pour the melted mass into suitable moulds, remove the suppositories when they are completely cold, and preserve them in tightly stoppered glass vessels.

SYRUPUS

Syrup

Sugar, in dry crystalline granules, *eight hundred and fifty grammes*	850 Gm.
Distilled Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Dissolve the Sugar, with the aid of heat, in *four hundred and fifty cubic centimeters* of Distilled Water, raise the temperature to the boiling point, strain the liquid, and pass enough Distilled Water through the strainer to make the product, when cold, measure *one thousand cubic centimeters.* Mix thoroughly.

Syrup may also be prepared in the following manner:

Press down into the neck of a percolator of suitable size a pledget of purified cotton, not too tightly, in such a manner that the cotton shall nearly fill the neck of the percolator, and moisten it with a few drops of Distilled Water; introduce the Sugar into the percolator, make its surface level without shaking or jarring, then carefully pour upon it *four hundred and fifty cubic centimeters* of Distilled Water, and regulate the flow of the liquid, if necessary, so that it will pass out in rapid drops. Return the first portions of the percolate until it runs through clear, and when all the liquid has passed, follow it by Distilled Water, added in portions, so that all the Sugar may be dissolved, and the product measure *one thousand cubic centimeters.* Mix thoroughly.

Syrup thus prepared has a specific gravity of about 1.313 at 25° C. (77° F.).

SYRUPUS ACACIÆ

Syrup of Acacia

Acacia, in selected pieces, *one hundred grammes*	100 Gm.
Sugar, *eight hundred grammes*	800 Gm.
Distilled Water, *four hundred and thirty cubic centimeters*	430 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Introduce the Acacia into an enamelled or porcelain dish, add the Distilled Water, and stir occasionally until the Acacia is dissolved; then, having added the Sugar, place the dish on a water-bath and apply heat, gradually increasing the temperature, and stirring from time to time until the Sugar is dissolved. Strain the Syrup, if necessary, and add sufficient Distilled Water to make the product measure *one thousand cubic centimeters.*

Syrup of Acacia should be made in small quantities, and stored in small, tightly stoppered bottles, in a cool place.

SYRUPUS ACIDI CITRICI

Syrup of Citric Acid

Citric Acid, *ten grammes*	10 Gm.
Distilled Water, *ten cubic centimeters*	10 Cc.
Tincture of Fresh Lemon Peel, *ten cubic centimeters*	10 Cc.
Syrup, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Dissolve the Citric Acid in the Distilled Water and mix the solution with *five hundred cubic centimeters* of Syrup, then add the Tincture of Fresh Lemon Peel, and lastly enough Syrup to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

SYRUPUS ACIDI HYDRIODICI

Syrup of Hydriodic Acid

A syrupy liquid containing about 1 percent., by weight, of absolute Hydriodic Acid [$HI = 126.9$], or about 1.19 Gm. in 100 Cc.

Diluted Hydriodic Acid, *one hundred grammes*	100 Gm.
Water, *three hundred grammes*	300 Gm.
Syrup, *six hundred grammes*	600 Gm.
To make *one thousand grammes*	1000 Gm.

Mix them.

A transparent, colorless, or not more than pale straw-colored liquid, odorless, and having a sweet and acidulous taste.

Specific gravity: about 1.190 at 25° C. (77° F.).

If a small portion of the Syrup be mixed with a little starch T.S., and a few drops of chlorine water then added, the liquid will acquire a deep blue color. Not more than a faint bluish tint should be produced in the Syrup by starch T.S. alone (limit of *free iodine*).

The addition of silver nitrate T.S. to a small portion of the Syrup diluted with four volumes of water produces a pale yellow precipitate, nearly insoluble in ammonia water.

If 31.73 (31.725) Gm. of Syrup of Hydriodic Acid be diluted with distilled water to measure 50 Cc., and if to 10 Cc. of this solution about an equal volume of distilled water, 8 Cc. of tenth-normal silver nitrate V.S., and 5 Cc. of diluted nitric acid be added, followed by 3 Cc. of ferric ammonium sulphate T.S., then, after thoroughly shaking the mixture, not more than 3 Cc. of tenth-normal potassium sulphocyanate V.S. should be required to produce a permanent reddish-brown tint (each Cc. of tenth-normal silver nitrate V.S. consumed corresponding to 0.2 percent. of absolute Hydriodic Acid).

Average dose.— 4 Cc. (1 fluidrachm).

SYRUPUS AMYGDALÆ

Syrup of Almond

Spirit of Bitter Almond, *ten cubic centimeters*	10 Cc.
Orange Flower Water, *one hundred cubic centimeters*	100 Cc.
Syrup, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix them.

Average dose.—4 Cc. (1 fluidrachm).

SYRUPUS AURANTII

Syrup of Orange

Tincture of Sweet Orange Peel, *fifty cubic centimeters* . .	50 Cc.
Citric Acid, *five grammes*	5 Gm.
Magnesium Carbonate, *ten grammes*	10 Gm.
Sugar, *eight hundred and twenty grammes*	820 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Triturate the Magnesium Carbonate in a mortar with the Tincture, add gradually *four hundred cubic centimeters* of Water, filter, and add sufficient Water through the filter to obtain *four hundred and fifty cubic centimeters* of filtrate; in this dissolve the Citric Acid and Sugar by agitation without heat, and add sufficient Water to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

SYRUPUS AURANTII FLORUM

Syrup of Orange Flowers

Sugar, *eight hundred and fifty grammes*	850 Gm.
Orange Flower Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Sugar in *four hundred and fifty cubic centimeters* of Orange Flower Water by agitation, without heat, add enough Orange Flower Water to make the product measure *one thousand cubic centimeters,* and mix thoroughly.

Syrup of Orange Flowers may also be prepared in the following manner:

Prepare a percolator or funnel in the manner described under *Syrupus.* Pour *four hundred and fifty cubic centimeters* of Orange Flower Water upon the Sugar, return the first portions of the percolate until it runs through clear, and, when all the liquid has passed, follow it by

Orange Flower Water, until the product measures *one thousand cubic centimeters.* Mix thoroughly.

SYRUPUS CALCII LACTOPHOSPHATIS

Syrup of Calcium Lactophosphate

Precipitated Calcium Carbonate, *twenty-five grammes*	25 Gm.
Lactic Acid, *sixty cubic centimeters*	60 Cc.
Phosphoric Acid, *thirty-six cubic centimeters*	36 Cc.
Orange Flower Water, *fifty cubic centimeters*	50 Cc.
Sugar, *seven hundred and twenty-five grammes*	725 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

To the Lactic Acid mixed with *one hundred cubic centimeters* of Water and contained in a capacious mortar, gradually add the Calcium Carbonate, in portions, stirring until it is dissolved. Then add the Phosphoric Acid, diluted with *fifty cubic centimeters* of Water, and triturate until the precipitate first formed is dissolved. Add *one hundred cubic centimeters* of Water, and filter, rinsing the mortar with *fifty cubic centimeters* of Water, and passing the rinsings through the filter. To the mixed filtrates add the Orange Flower Water, and, having added the Sugar, dissolve it by agitation, without heat, and strain. Lastly, pass enough Water through the strainer to make the product measure *one thousand cubic centimeters,* and mix thoroughly.

Average dose.—8 Cc. (2 fluidrachms).

SYRUPUS CALCIS

Syrup of Lime Syrup of Calcium Hydroxide

Lime, *sixty-five grammes*	65 Gm.
Sugar, *three hundred and fifty grammes*	350 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Slake the Lime by the addition of *thirty-five cubic centimeters* of Water with the aid of heat, then mix it and the Sugar thoroughly in a mortar, so as to form a homogeneous powder; add the mixture to *five hundred cubic centimeters* of boiling Water, contained in a bright copper or tinned-iron vessel, and boil for five minutes, constantly stirring. Dilute the liquid with sufficient Water to make it measure *nine hundred and fifty cubic centimeters,* and filter through white paper, closely covering the funnel during filtration. Then add through the filter enough Water to make the product measure *one thousand cubic centimeters*, and mix thoroughly.

Keep the Syrup in well-stoppered bottles.

A transparent, pale yellow liquid, of alkaline taste and reaction.

Specific gravity: about 1.145 at 25° C. (77°F.).

The addition of a solution of an alkali carbonate produces a white precipitate, soluble in acids with effervescence.

The addition of ammonium oxalate T.S. produces a white precipitate, insoluble in acetic acid, but soluble in hydrochloric acid.

Average dose.—2 Cc. (30 minims).

SYRUPUS FERRI IODIDI

Syrup of Ferrous Iodide

A syrupy liquid containing about 5 percent., by weight, of Ferrous Iodide [$FeI_2 = 307.30$], or about 6.74 Gm. in 100 Cc.

Iron, in the form of fine, bright wire, and cut into small pieces, *twelve and one-half grammes*	12.5 Gm.
Iodine, *forty-one and one-half grammes*	41.5 Gm.
Diluted Hypophosphorous Acid, *twenty cubic centimeters*	20.0 Cc.
Sugar, *six hundred grammes*	600.0 Gm.
Distilled Water, *a sufficient quantity*,	
To make *one thousand grammes*	1000 Gm.

Introduce the Iron into a flask of thin glass, having a capacity of about *five hundred cubic centimeters*, add to it *one hundred and fifty cubic centimeters* of Distilled Water, and afterwards the Iodine. Shake the mixture occasionally, checking the reaction, if necessary, by the affusion of cold water, and, when the solution has acquired a greenish color, and has lost the odor of Iodine, heat it to boiling and add at once *fifty grammes* of the Sugar; when this has dissolved, filter the solution into the remainder of the Sugar contained in a porcelain dish. Rinse the flask and Iron Wire with *one hundred and twenty-five cubic centimeters* of Distilled Water and pass the washings through the filter into the Sugar. Stir the mixture with a porcelain or wooden spatula, heating the liquid on a water-bath until complete solution is effected, and, having passed the syrup through a clean muslin strainer into a tared bottle, add the Diluted Hypophosphorous Acid, and sufficient Distilled Water to make the product weigh *one thousand grammes*.

A transparent, pale green or yellowish green liquid, having a sweet, strongly ferruginous taste and an acid reaction.

Specific gravity: about 1.349 at 25° C. (77° F.).

On adding a few drops of potassium ferricyanide T.S. to a small portion of the diluted Syrup a blue precipitate will be produced.

If mixed with a little starch T.S., and afterwards with a few drops of chlorine water the syrup will acquire a [illegible] color. This color should not be [illegible] [illegible]

[illegible] distilled water to measure [illegible] or water [illegible] diluted nitric acid and [illegible] shaking the mixture [illegible] it should be required [illegible] permanent [illegible] of tenth-normal silver nitrate [illegible] Potassium Iodide.

Average dose.—1 Cc. (15 minims).

SYRUPUS FERRI QUININÆ ET STRYCHNINÆ PHOSPHATUM

Syrup of the Phosphates of Iron, Quinine and Strychnine

Glyceritum of the Phosphates of Iron, Quinine and Strychnine, two hundred and fifty cubic centimeters	250 Cc.
Syrup, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix them. Strain if necessary.

Average dose.—4 Cc. (1 fluidram).

SYRUPUS HYPOPHOSPHITUM

Syrup of Hypophosphites

Calcium Hypophosphite, forty-five grammes	45 Gm.
Potassium Hypophosphite, fifteen grammes	15 Gm.
Sodium Hypophosphite, fifteen grammes	15 Gm.
Diluted Hypophosphorous Acid, two grammes	2 Gm.
Sugar, seven hundred and fifty grammes	750 Gm.
Tincture of Fresh Lemon Peel, five cubic centimeters	5 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Hypophosphites with four hundred and fifty cubic centimeters of Water, until they are dissolved, add the Tincture of Fresh Lemon Peel and the Hypophosphorous Acid, and filter the liquid. In the filtrate dissolve the Sugar by agitation without heat, and add enough water, through the filter, to make the product measure one thousand cubic centimeters. Strain if necessary.

Syrup of Hypophosphites may also be prepared in the following manner:

Prepare a percolator or funnel in the manner described under Syrupus. Pour the filtrate obtained as directed in the preceding formula upon the Sugar, return the first portions of the percolate.

until it runs through clear, and, when all the liquid has passed, follow it with Water, until the product measures *one thousand cubic centimeters*. Mix thoroughly.

Average dose.— 8 Cc. (2 fluidrachms).

SYRUPUS HYPOPHOSPHITUM COMPOSITUS

Compound Syrup of Hypophosphites

Calcium Hypophosphite, *thirty-five grammes*	35.00	Gm.
Potassium Hypophosphite, *seventeen and one-half grammes*	17.50	Gm.
Sodium Hypophosphite, *seventeen and one-half grammes*	17.50	Gm.
Ferric Hypophosphite, *two and one-fourth grammes*	2.25	Gm.
Manganese Hypophosphite, *two and one-fourth grammes*	2.25	Gm.
Quinine, *one and one-tenth grammes*	1.10	Gm.
Strychnine, *one hundred and fifteen milligrammes*	0.115	Gm.
Sodium Citrate, *three and three-fourths grammes*	3.75	Gm.
Diluted Hypophosphorous Acid, *fifteen cubic centimeters*	15.00	Cc.
Sugar, *seven hundred and seventy-five grammes*	775.00	Gm.
Water, *a sufficient quantity*,		
To make *one thousand cubic centimeters*	1000	Cc.

Rub the Ferric and Manganese Hypophosphites with the Sodium Citrate, add *thirty cubic centimeters* of Water and warm the mixture for a few minutes, until a clear greenish solution is obtained. Dissolve the Calcium, Potassium, and Sodium Hypophosphites in *four hundred cubic centimeters* of Water, to which *five cubic centimeters* of Diluted Hypophosphorous Acid has previously been added; then dissolve the Quinine and Strychnine in *thirty cubic centimeters* of Water with the aid of *ten cubic centimeters* of Diluted Hypophosphorous Acid, and finally dissolve the Sugar, with agitation, in these solutions, previously mixed.

Strain the Syrup, if necessary, and add sufficient Water, through the strainer, to make the product measure *one thousand cubic centimeters*.

Average dose.— 8 Cc. (2 fluidrachms).

SYRUPUS IPECACUANHÆ

Syrup of Ipecac

Fluidextract of Ipecac, *seventy cubic centimeters*	70 Cc.
Acetic Acid, *ten cubic centimeters*	10 Cc.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Sugar, *seven hundred grammes*	700 Gm.
Water, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Dilute the Fluidextract of Ipecac with *three hundred cubic centimeters* of Water to which the Acetic Acid has previously been added, and mix them thoroughly by shaking: set the liquid aside in a cool place for twenty-four hours. Then filter, and pass enough Water through the filter to obtain *four hundred and fifty cubic centimeters* of filtrate. To this liquid add the Glycerin, dissolve the Sugar in the mixture, and add enough Water to make the product measure *one thousand cubic centimeters.* Mix thoroughly, and strain, if necessary.

Syrup of Ipecac may also be prepared in the following manner:

Prepare a percolator or funnel in the manner described under *Syrupus.*

Mix the filtrate, obtained as directed in the preceding formula with the Glycerin, pour the mixture upon the Sugar, return the first portions of the percolate, until it runs through clear, and, when all the liquid has passed, follow it with Water, until the product measures *one thousand cubic centimeters.* Mix thoroughly.

Average dose.— { Expectorant, 1 Cc. (15 minims).
{ Emetic, 15 Cc. (4 fluidrachms).

SYRUPUS KRAMERIÆ

Syrup of Krameria

Fluidextract of Krameria, *four hundred and fifty cubic centimeters*	450 Cc.
Syrup, *five hundred and fifty cubic centimeters*	550 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them.

Average dose.—4 Cc. (1 fluidrachm).

SYRUPUS LACTUCARII

Syrup of Lactucarium

Tincture of Lactucarium, *one hundred cubic centimeters*	100 Cc.
Glycerin, *two hundred cubic centimeters*	200 Cc.
Citric Acid, *one gramme*	1 Gm.
Orange Flower Water, *fifty cubic centimeters*	50 Cc.
Syrup, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Tincture of Lactucarium with the Glycerin, add the Orange Flower Water in which the Citric Acid has been previously dissolved, and filter, if necessary. Finally, add a sufficient quantity of Syrup to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

Average dose.— 8 Cc. (2 fluidrachms).

SYRUPUS PICIS LIQUIDÆ

Syrup of Tar

Tar, *five grammes*	5 Gm.
Alcohol, *fifty cubic centimeters*	50 Cc.
Magnesium Carbonate, *ten grammes*	10 Gm.
Sugar, *eight hundred and fifty grammes*	850 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Tar intimately, in a mortar, with *ten grammes* of clean white sand, add *one hundred cubic centimeters* of Water, and, after kneading the mass thoroughly with the pestle, pour off the Water and throw it away. Treat the residue with the Alcohol, and, when the Tar is dissolved, add the Magnesium Carbonate and *fifty grammes* of Sugar, and after thorough trituration add *four hundred cubic centimeters* of Water; stir the mixture occasionally during two hours, and filter. Dissolve the remainder of the Sugar in the clear filtrate by gentle heat, strain, and add sufficient Water to make the product measure *one thousand cubic centimeters.*

Average dose.— 4 Cc. (1 fluidrachm).

SYRUPUS PRUNI VIRGINIANÆ

Syrup of Wild Cherry

Wild Cherry, in No. 20 powder, *one hundred and fifty grammes*	150 Gm.
Sugar, *seven hundred grammes*	700 Gm.
Glycerin, *one hundred and fifty cubic centimeters*	150 Cc.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Moisten the Wild Cherry with a sufficient quantity of Water, and macerate for twenty-four hours in a covered vessel; introduce the Glycerin into a graduated receiving bottle; pack the Wild Cherry firmly in a cylindrical percolator, and gradually pour Water upon it; continue the percolation (shaking the percolate occasionally with the Glycerin), until the liquid measures *four hundred and fifty cubic centimeters.* Dissolve the Sugar in the liquid by agitation, without heat, strain, and pass enough Water through the strainer to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

Syrup of Wild Cherry may also be prepared in the following manner:

Prepare a percolator or funnel in the manner described under *Syrupus.* Pour the percolate obtained as directed in the preceding formula upon the Sugar, return the first portions of the percolate, until it runs through clear, and, when all the liquid has passed, follow it with Water, until the product measures *one thousand cubic centimeters.* Mix thoroughly.

Average dose.—4 Cc. (1 fluidrachm).

SYRUPUS RHEI

Syrup of Rhubarb

Fluidextract of Rhubarb, *one hundred cubic centimeters* . .	100 Cc.
Spirit of Cinnamon, *four cubic centimeters*	4 Cc.
Potassium Carbonate, *ten grammes*	10 Gm.
Water, *fifty cubic centimeters*	50 Cc.
Syrup, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Spirit of Cinnamon with the Fluidextract of Rhubarb, and add to it the Potassium Carbonate previously dissolved in the Water, and lastly enough Syrup to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

Average dose.—8 Cc. (2 fluidrachms).

SYRUPUS RHEI AROMATICUS

Aromatic Syrup of Rhubarb

Aromatic Tincture of Rhubarb, *one hundred and fifty cubic centimeters*	150 Cc.
Potassium Carbonate, *one gramme*	1 Gm.
Syrup, *eight hundred and fifty cubic centimeters*	850 Cc.
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Potassium Carbonate in the Aromatic Tincture of Rhubarb. Filter, if necessary, and add sufficient Syrup to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

Average dose.—8 Cc. (2 fluidrachms).

SYRUPUS ROSÆ

Syrup of Rose

Fluidextract of Rose, *one hundred and twenty-five cubic centimeters*	125 Cc.
Diluted Sulphuric Acid, *ten cubic centimeters*	10 Cc.
Sugar, *seven hundred and fifty grammes*	750 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Fluidextract of Rose and Diluted Sulphuric Acid with *three hundred cubic centimeters* of Water; after allowing the mixture to stand two hours, filter, and dissolve the Sugar in the clear filtrate, by agitation. Finally, add a sufficient quantity of Water to make the product measure *one thousand cubic centimeters.* Strain, if necessary.

SYRUPUS RUBI

Syrup of Rubus

Fluidextract of Rubus, *two hundred and fifty cubic centimeters*	250 Cc.
Syrup, *seven hundred and fifty cubic centimeters*	750 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them.

Average dose.—4 Cc. (1 fluidrachm).

SYRUPUS SARSAPARILLÆ COMPOSITUS

Compound Syrup of Sarsaparilla

Fluidextract of Sarsaparilla, *two hundred cubic centimeters*	200.0 Cc.
Fluidextract of Glycyrrhiza, *fifteen cubic centimeters*	15.0 Cc.
Fluidextract of Senna, *fifteen cubic centimeters*	15.0 Cc.
Sugar, *six hundred and fifty grammes*	650.0 Gm.
Oil of Sassafras, *two-tenths of a cubic centimeter*	0.2 Cc.
Oil of Anise, *two-tenths of a cubic centimeter*	0.2 Cc.
Oil of Gaultheria, *two-tenths of a cubic centimeter*	0.2 Cc.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Add the Oils (equivalent to about *four drops* each) to the mixed Fluidextracts and shake the liquid thoroughly. Then add enough Water to make up the volume to *six hundred cubic centimeters,* and mix well. Set the mixture aside for one hour, and then filter it. Dissolve the Sugar in the filtrate with the aid of a gentle heat, allow the liquid to cool, strain, and add enough Water, through the strainer, to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

Average dose.— 16 Cc. (4 fluidrachms).

SYRUPUS SCILLÆ

Syrup of Squill

Vinegar of Squill, *four hundred and fifty cubic centimeters* . .	450 Cc.
Sugar, *eight hundred grammes*	800 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Sugar in the Vinegar of Squill with the aid of a gentle heat, then strain, and, when the strained liquid is cold, add enough Water, through the strainer, to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

Average dose.— 2 Cc. (30 minims).

SYRUPUS SCILLÆ COMPOSITUS

Compound Syrup of Squill

Fluidextract of Squill, *eighty cubic centimeters*	80 Cc.
Fluidextract of Senega, *eighty cubic centimeters*	80 Cc.
Antimony and Potassium Tartrate, *two grammes*	2 Gm.
Purified Talc, *twenty grammes*	20 Gm.
Sugar, *seven hundred and fifty grammes*	750 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Fluidextracts, evaporate them, in a tared dish, on a water-bath, to *one hundred grammes*, and mix the residue with *three hundred and fifty cubic centimeters* of Water. When the mixture is cold, incorporate with it, intimately, the Purified Talc, filter, pass enough Water through the filter to obtain *four hundred cubic centimeters* of clear filtrate, and add to this the Antimony and Potassium Tartrate previously dissolved in *twenty-five cubic centimeters* of hot Water. Dissolve the Sugar in this liquid by agitation, without heat, strain, and add enough Water, through the strainer, to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

Compound Syrup of Squill may also be prepared in the following manner:

Prepare a percolator or funnel in the manner described under *Syrupus.* Pour the filtrate obtained as directed in the preceding formula, and mixed with the solution of Antimony and Potassium Tartrate, upon the Sugar, return the first portions of the percolate, until it runs through clear, and, when all the liquid has passed, follow it with Water, until the product measures *one thousand cubic centimeters.* Mix thoroughly.

Average dose.—2 Cc. (30 minims).

SYRUPUS SENEGÆ

Syrup of Senega

Fluidextract of Senega, *two hundred cubic centimeters*	200 Cc.
Syrup, *eight hundred cubic centimeters*	800 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them.

Average dose.—4 Cc. (1 fluidrachm).

SYRUPUS SENNÆ

Syrup of Senna

Fluidextract of Senna, *two hundred and fifty cubic centimeters*	250 Cc.
Oil of Coriander, *five cubic centimeters*	5 Cc.
Syrup, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Oil of Coriander with the Fluidextract of Senna and add a sufficient quantity of Syrup to make the product measure *one thousand cubic centimeters.* Mix thoroughly.

Average dose.—4 Cc. (1 fluidrachm).

SYRUPUS TOLUTANUS

Syrup of Tolu

Tincture of Tolu, *fifty cubic centimeters*	50 Cc.
Magnesium Carbonate, *ten grammes*	10 Gm.
Sugar, *eight hundred and twenty grammes*	820 Gm.
Water, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Rub the Tincture of Tolu, in a mortar, with the Magnesium Carbonate and *sixty grammes* of the Sugar. Then gradually add *four hundred and fifty cubic centimeters* of Water, with constant trituration, and filter. Dissolve the remainder of the Sugar in the clear filtrate, with the aid of a gentle heat, strain the Syrup while hot, and add a *timeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—0.5 Cc. (8 minims).

TINCTURA CARDAMOMI

Tincture of Cardamom

Cardamom, in No. 20 powder, *two hundred grammes*	200 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Cardamom with *eighty cubic centimeters* of Diluted Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Diluted Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA CARDAMOMI COMPOSITA

Compound Tincture of Cardamom

Cardamom, *twenty-five grammes*	25 Gm.
Saigon Cinnamon, *twenty-five grammes*	25 Gm.
Caraway, *twelve grammes*	12 Gm.
Cochineal, *five grammes*	5 Gm.
Glycerin, *fifty cubic centimeters*	50 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *nine hundred and fifty cubic centimeters* of Diluted Alcohol. Reduce the Cardamom, Saigon Cinnamon, Caraway and Cochineal to a No. 40 powder, and macerate this powder in a stoppered container, in a moderately warm place, with *seven hundred*

Insoluble in water, and in dilute solutions of the acids and alkali hydroxides.

Specific gravity: 2.2 to 2.8.

Mix 0.5 Gm. of Talc with about 2 Gm. each of anhydrous sodium and potassium carbonates, heat the mixture in a platinum crucible until fusion is complete, and treat the resulting fused mass with hot water; then neutralize the liquid with diluted sulphuric acid, and, after adding an additional 10 Cc. of the latter, evaporate the mixture until the white fumes of sulphuric anhydride are evolved, then add 20 Cc. of water, and, after boiling the mixture and filtering, an insoluble residue of *silica* should be left. If to the filtrate ammonia water and ammonium chloride T.S. be added, a white, gelatinous precipitate of *aluminum hydroxide* may be formed, while the filtrate from this, upon the addition of sodium phosphate T.S., should yield a white, crystalline precipitate (*magnesium salts*).

If 1 Gm. of Talc be boiled with 25 Cc. of diluted hydrochloric acid for one-half hour, adding water from time to time to maintain approximately the original volume, and the liquid filtered, then the filtrate should yield, upon evaporating to dryness, igniting, and quickly weighing, not more than 0.05 Gm. of residue.

TALCUM PURIFICATUM

Purified Talc

Talc, in fine powder, *five hundred grammes*	**500 Gm.**
Hydrochloric Acid, *seventy-five cubic centimeters*	**75 Cc.**
Water, *a sufficient quantity.*	

Mix the powdered Talc with about *twenty-five hundred cubic centimeters* of boiling Water, gradually add *fifty cubic centimeters* of the Hydrochloric Acid, and boil the mixture during fifteen minutes, then allow it to stand for fifteen minutes. Decant, and reject the supernatant liquid containing the finer particles of Talc in suspension, and again boil the residue with *twenty-five hundred cubic centimeters* of Water, mixed with the remainder of the Hydrochloric Acid, and allow it to stand for fifteen minutes. Again decant, and reject the finer suspended particles, and wash the coarser residue with Water by repeated decantation, until a portion of the wash-water, after filtering and acidifying with nitric acid, fails to become opalescent upon the addition of silver nitrate test solution. Then transfer the magma to a close linen or muslin strainer, allow it to drain, and dry it at 110° C. (230° F.).

Purified Talc, when subjected to ignition at red heat, should lose not more than 5 percent. of its weight.

If 10 Gm. of Purified Talc be boiled with 50 Cc. of distilled water for one-half hour, adding water from time to time to maintain approximately the original volume, it should yield a filtrate which is neutral to litmus paper, and one-half of this filtrate, when evaporated and dried at 110° C. (230° F.), should yield not more than 0.005 Gm. of residue (limit of *soluble substances*).

The remaining half of the filtrate, after slightly acidulating with hydrochloric acid, should not yield a blue color upon the addition of potassium ferrocyanide T.S. (absence of *iron*).

forty-eight hours. Then allow the percolation to proceed slowly, pouring on first the remainder of the menstruum, and then sufficient of a mixture of Alcohol and Water, made in the same proportions as before, until *one thousand cubic centimeters* of percolate are obtained.

Tincture of Cinchona, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.75 Gm. of anhydrous ether-soluble alkaloids of Cinchona.

Assay of Tincture of Cinchona

Transfer 50 Cc. of Tincture of Cinchona to an evaporating dish, and evaporate it on a water-bath until it measures about 10 Cc., transfer the liquid to a bottle having the capacity of about 180 Cc., rinsing the dish with 10 Cc. of diluted alcohol, then assay the resulting liquid by the method given under *Fluidextractum Cinchonæ* (page 174), with the exception that the multiplication of the product should be by 4 instead of 20; the result will represent the weight in grammes of anhydrous ether-soluble alkaloids contained in *one hundred cubic centimeters* of Tincture of Cinchona.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA CINCHONÆ COMPOSITA

Compound Tincture of Cinchona

Red Cinchona (yielding not less than 5 percent. of anhydrous cinchona alkaloids), *one hundred grammes*	100 Gm.
Bitter Orange Peel, *eighty grammes*	80 Gm.
Serpentaria, *twenty grammes*	20 Gm.
Glycerin, *seventy-five cubic centimeters*	75 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Glycerin with *six hundred and seventy-five cubic centimeters* of Alcohol and *two hundred and fifty cubic centimeters* of Water. Reduce the Red Cinchona, Bitter Orange Peel and Serpentaria to a No. 60 powder, moisten this powder with *eighty cubic centimeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, pouring on first the remainder of the menstruum, and then sufficient of a mixture of Alcohol and Water, made in the same proportions as before, to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TEREBINTHINA

Turpentine

A concrete oleoresin obtained from *Pinus palustris* Miller, and from other species of *Pinus* (Fam. *Pinaceæ*).

In yellowish, opaque masses, brittle in the cold; lighter internally, sticky and more or less glossy; odor and taste terebinthinate.

The alcoholic solution of Turpentine has an acid reaction.

TEREBINTHINA CANADENSIS

Canada Turpentine

A liquid oleoresin obtained from *Abies balsamea*, (Linné) Miller (Fam. *Coniferæ*).

Viscid, pale yellowish or greenish-yellow, transparent; odor agreeable; taste terebinthinate, bitter, and slightly acrid.

When exposed to the air, Canada Turpentine gradually dries and forms a transparent varnish; it solidifies on being mixed with 20 percent. of its weight of magnesium oxide previously moistened with water; it is completely soluble in ether, chloroform, or benzene.

TERPINI HYDRAS

Terpin Hydrate

$C_{10}H_{20}O_2 + H_2O = 188.74$

The hydrate $[C_{10}H_{18}(OH)_2 + H_2O]$ of the diatomic alcohol terpin. Terpin Hydrate should be kept in well-stoppered bottles.

Colorless, lustrous, rhombic prisms, nearly odorless, and having a slightly aromatic and somewhat bitter taste. Permanent in the air.

Soluble in about 200 parts of water, and in 10 parts of alcohol at 25° C. (77° F.); in 32 parts of boiling water, and in 2 parts of boiling alcohol; also soluble in about 100 parts of ether, 200 parts of chloroform, or 1 part of boiling glacial acetic acid.

Terpin Hydrate melts when quickly heated at 116° to 117° C. (240.8° to 242.6° F.), with the loss of water, and, at the temperature of boiling water, sublimes in fine needles.

When heated in a flask adapted for distillation, it first loses water. At 258° C. (496.4° F.) anhydrous terpin distils over without decomposition, soon solidifying to a crystalline, hygroscopic mass, which melts at 102° to 105° C. (215.6° to 221° F.). When strongly heated on platinum foil, it burns with a bright, smoky flame, leaving no residue.

If to its hot, aqueous solution a few drops of sulphuric acid be added, the liquid will become turbid and develop a strongly aromatic odor.

Terpin Hydrate should not have the odor of turpentine, and its hot, aqueous solution should not redden blue litmus paper.

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

It is decomposed when heated to the melting point.

It is not soluble in solution of sodium hydroxide, either cold or warm. When heated with concentrated sulphuric acid, it is decomposed with the separation of iodine.

If 0.1 Gm. be shaken with 20 Cc. of water, the mixture, on filtering, will yield a filtrate which should not become more than opalescent on the addition of nitric acid and silver nitrate T.S. (limit of *halogen salts*).

If 0.5 Gm. be shaken with 10 Cc. of water, and the mixture filtered, no blue color should be imparted by the filtrate to red litmus paper (absence of *alkalies*).

If 0.5 Gm. be shaken with 10 Cc. of water, and the mixture filtered, the filtrate should not be colored blue upon the addition of starch T.S. (absence of *free iodine*).

If 0.1 Gm. of Thymol Iodide be thoroughly ignited in a porcelain crucible, it should leave not more than 0.003 Gm. of residue (limit of *ash*).

TINCTURA ACONITI

Tincture of Aconite

NOTE.—The strength of this Tincture has been reduced from 35 Gm. of Aconite in 100 Cc. (Pharm. 1890) to 10 Gm. of Aconite in 100 Cc.

Aconite, in No. 60 powder (containing not less than 0.5 per-cent. of aconitine), *one hundred grammes*	100 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix Alcohol and Water in the proportion of *seven hundred cubic centimeters* of Alcohol to *three hundred cubic centimeters* of Water. Moisten the Aconite with *forty cubic centimeters* of this menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it very firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding menstruum until *one thousand cubic centimeters* are obtained.

Tincture of Aconite, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.045 Gm. of aconitine.

Assay of Tincture of Aconite

Transfer 100 Cc. of Tincture of Aconite to an evaporating dish and evaporate it carefully to dryness at a temperature not exceeding 60° C. (140° F.), and assay the resulting extract by the method given under *Fluidextractum Aconiti*, page 165, using the same details as there directed for 10 Cc. of Fluidextract of Aconite, with the exception that the multiplication of the product by 10 must be omitted;

TINCTURA GAMBIR COMPOSITA

Compound Tincture of Gambir

[To replace TINCTURA CATECHU COMPOSITA, PHARM. 1890]

Gambir, in No. 50 powder, *fifty grammes*	50 Gm.
Saigon Cinnamon, in No. 50 powder, *twenty-five grammes*	25 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Macerate the Gambir and Saigon Cinnamon in a stoppered container, in a moderately warm place, with *seven hundred and fifty cubic centimeters* of Diluted Alcohol during forty-eight hours, with frequent agitation; then filter through purified cotton, or a plain filter, and, when the liquid has drained off completely, pass enough menstruum through the residue to make *one thousand cubic centimeters* of Tincture.

Average dose.— 4 Cc. (1 fluidrachm).

TINCTURA GELSEMII

Tincture of Gelsemium

Gelsemium, in No. 60 powder, *one hundred grammes*	100 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Mix *six hundred and fifty cubic centimeters* of Alcohol with *three hundred and fifty cubic centimeters* of Water. Moisten the Gelsemium with *thirty-five cubic centimeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 0.5 Cc. (8 minims).

TINCTURA GENTIANÆ COMPOSITA

Compound Tincture of Gentian

Gentian, *one hundred grammes*	100 Gm.
Bitter Orange Peel, *forty grammes*	40 Gm.
Cardamom, *ten grammes*	10 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

TINCTURA ARNICÆ

Tincture of Arnica

[TINCTURA ARNICÆ FLORUM, PHARM. 1890]

Arnica, in No. 20 powder, *two hundred grammes*	200 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Macerate the Arnica with *five hundred cubic centimeters* of Diluted Alcohol in a closed vessel, in a moderately warm place, for three days, with occasional stirring, and express strongly. Repeat this operation twice successively with *two hundred and fifty cubic centimeters* of Diluted Alcohol, macerating for twenty-four hours each time; then, having ascertained the volume of the united expressed liquids, macerate the residual marc for six hours with sufficient menstruum to make approximately *one thousand cubic centimeters*, and express as before. Mix the expressed liquids, filter through paper, and pass sufficient Diluted Alcohol through the filter to make *one thousand cubic centimeters* of Tincture.

Average dose.—1 Cc. (15 minims).

TINCTURA ASAFŒTIDÆ

Tincture of Asafetida

Asafetida, well bruised, *two hundred grammes*	200 Gm.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Macerate the Asafetida in a stoppered container, in a moderately warm place, with *seven hundred and fifty cubic centimeters* of Alcohol, during three days, with frequent agitation; then filter through purified cotton, or a plain paper filter, and, when the liquid has drained off completely, pass enough Alcohol through the residue to make *one thousand cubic centimeters* of Tincture.

Average dose.—1 Cc. (15 minims).

TINCTURA AURANTII AMARI

Tincture of Bitter Orange Peel

Bitter Orange Peel, in No. 40 powder, *two hundred grammes* .	200 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Transfer this to a stoppered container with the aid of *five hundred cubic centimeters* of Alcohol, add the Storax and Balsam of Tolu, and set the mixture aside in a moderately warm place, shaking it frequently during three days; then transfer it to a paper filter, and, when the liquid has drained off completely, pour on enough Alcohol to make *one thousand cubic centimeters* of Tincture.

Average dose.— 2 Cc. (30 minims).

TINCTURA CALENDULÆ

Tincture of Calendula

Calendula, in No. 20 powder, *two hundred grammes*	200 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Calendula with *eighty cubic centimeters* of Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it very firmly and pour on enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

TINCTURA CALUMBÆ

Tincture of Calumba

Calumba, in No. 20 powder, *two hundred grammes*	200 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *four hundred cubic centimeters* of Water. Moisten the Calumba with *one hundred cubic centimeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for twenty-four hours; then pack it with moderate pressure, pour on enough menstruum to saturate the powder and leave a stratum above it, and allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 4 Cc. (1 fluidrachm).

gradually pouring on Diluted Alcohol until *one thousand cubic centimeters* of percolate are obtained.

Tincture of Belladonna Leaves, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.03 Gm. of the alkaloids from Belladonna Leaves.

Assay of Tincture of Belladonna Leaves

Transfer 100 Cc. of Tincture of Belladonna Leaves to an evaporating dish and evaporate it on a water-bath until it measures about 10 Cc. Add, if necessary, sufficient alcohol to dissolve any separated substance, and then assay the resulting liquid by the method given under *Fluidextractum Belladonnæ Radicis* (page 168), using the same details as there directed for 10 Cc. of Fluidextract of Belladonna Root, with the exception that the multiplication of the product by 10 be omitted; the result will represent the weight in grammes of alkaloids contained in *one hundred cubic centimeters* of Tincture of Belladonna Leaves.

Average dose.— 0.5 Cc. (8 minims).

TINCTURA BENZOINI

Tincture of Benzoin

Benzoin, in No. 40 powder, *two hundred grammes*	200 Gm
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Triturate the Benzoin with *two hundred and fifty cubic centimeters* of Alcohol until a uniform magma is obtained. Transfer this to a stoppered container with the aid of *five hundred cubic centimeters* of Alcohol, and set it aside in a moderately warm place, shaking frequently during three days. Then transfer the mixture to a paper filter, and, when the liquid has drained off completely, pour on enough Alcohol to make *one thousand cubic centimeters* of Tincture.

Average dose.—1 Cc. (15 minims).

TINCTURA BENZOINI COMPOSITA

Compound Tincture of Benzoin

Benzoin, in No. 40 powder, *one hundred grammes*	100 Gm.
Purified Aloes, in No. 40 powder, *twenty grammes*	20 Gm.
Storax, *eighty grammes*	80 Gm.
Balsam of Tolu, *forty grammes*	40 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Triturate the Benzoin and Purified Aloes with *two hundred and fifty cubic centimeters* of Alcohol until a uniform magma is obtained.

timeters of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 0.5 Cc. (8 minims).

TINCTURA CARDAMOMI

Tincture of Cardamom

Cardamom, in No. 30 powder, *two hundred grammes*	200 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Cardamom with *eighty cubic centimeters* of Diluted Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Diluted Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 4 Cc. (1 fluidrachm).

TINCTURA CARDAMOMI COMPOSITA

Compound Tincture of Cardamom

Cardamom, *twenty-five grammes*	25 Gm.
Saigon Cinnamon, *twenty-five grammes*	25 Gm.
Caraway, *twelve grammes*	12 Gm.
Cochineal, *five grammes*	5 Gm.
Glycerin, *fifty cubic centimeters*	50 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *nine hundred and fifty cubic centimeters* of Diluted Alcohol. Reduce the Cardamom, Saigon Cinnamon, Caraway and Cochineal to a No. 40 powder, and macerate this powder in a stoppered container, in a moderately warm place, with *seven hundred*

TINCTURA CANNABIS INDICÆ

Tincture of Indian Cannabis

Indian Cannabis, in No. 40 powder, *one hundred grammes* . .	100 Gm.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Indian Cannabis with *fifty cubic centimeters* of Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it very firmly and pour on enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 0.6 Cc. (10 minims).

TINCTURA CANTHARIDIS

Tincture of Cantharides

Cantharides, in No. 60 powder, *one hundred grammes*	100 Gm.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Cantharides with *thirty-five cubic centimeters* of Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it very firmly and pour on enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 0.3 Cc. (5 minims).

TINCTURA CAPSICI

Tincture of Capsicum

Capsicum, in No. 50 powder, *one hundred grammes*	100 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *nine hundred and fifty cubic centimeters* of Alcohol with *fifty cubic centimeters* of Water. Moisten the Capsicum with *thirty-five cubic cen-*

forty-eight hours. Then allow the percolation to proceed slowly, pouring on first the remainder of the menstruum, and then sufficient of a mixture of Alcohol and Water, made in the same proportions as before, until *one thousand cubic centimeters* of percolate are obtained.

Tincture of Cinchona, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.75 Gm. of anhydrous ether-soluble alkaloids of Cinchona.

Assay of Tincture of Cinchona

Transfer 50 Cc. of Tincture of Cinchona to an evaporating dish, and evaporate it on a water-bath until it measures about 10 Cc., transfer the liquid to a bottle having the capacity of about 180 Cc., rinsing the dish with 10 Cc. of diluted alcohol, then assay the resulting liquid by the method given under *Fluidextractum Cinchonæ* (page 174), with the exception that the multiplication of the product should be by 4 instead of 20; the result will represent the weight in grammes of anhydrous ether-soluble alkaloids contained in *one hundred cubic centimeters* of Tincture of Cinchona.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA CINCHONÆ COMPOSITA

Compound Tincture of Cinchona

Red Cinchona (yielding not less than 5 percent. of anhydrous cinchona alkaloids), *one hundred grammes*	100 Gm.
Bitter Orange Peel, *eighty grammes*	80 Gm.
Serpentaria, *twenty grammes*	20 Gm.
Glycerin, *seventy-five cubic centimeters*	75 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Glycerin with *six hundred and seventy-five cubic centimeters* of Alcohol and *two hundred and fifty cubic centimeters* of Water. Reduce the Red Cinchona, Bitter Orange Peel and Serpentaria to a No. 60 powder, moisten this powder with *eighty cubic centimeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, pouring on first the remainder of the menstruum, and then sufficient of a mixture of Alcohol and Water, made in the same proportions as before, to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

and fifty cubic centimeters of the menstruum during seven days, with occasional agitation; then filter through purified cotton, or a plain filter, and, when the liquid has drained off completely, pour on the residue, first the remainder of the menstruum, and then sufficient Diluted Alcohol to make *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA CIMICIFUGÆ

Tincture of Cimicifuga

Cimicifuga, in No. 40 powder, *two hundred grammes*	200 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Cimicifuga with *sixty cubic centimeters* of Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA CINCHONÆ

Tincture of Cinchona

Cinchona, in No. 60 powder (yielding not less than 4 percent. of anhydrous ether-soluble alkaloids), *two hundred grammes*	200 Gm.
Glycerin, *seventy-five cubic centimeters*	75 Cc.
Alcohol, **Water**, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *six hundred and seventy-five cubic centimeters* of Alcohol and *two hundred and fifty cubic centimeters* of Water. Moisten the Cinchona with *eighty cubic centimeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for

Tincture of Colchicum Seed, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.04 Gm. of colchicine.

Assay of Tincture of Colchicum Seed

Transfer 100 Cc. of Tincture of Colchicum Seed to an evaporating dish, and evaporate it on a water-bath until it measures about 10 Cc. Add, if necessary, sufficient alcohol to dissolve any separated substance, and then assay the resulting liquid by the method given under *Fluidextractum Colchici Seminis* (page 176), with the exception that the multiplication of the product by 10 be omitted; the result will represent the weight in grammes of colchicine contained in *one hundred cubic centimeters* of Tincture of Colchicum Seed.

Average dose.—2 Cc. (30 minims).

TINCTURA DIGITALIS

Tincture of Digitalis

Digitalis, in No. 60 powder, *one hundred grammes*	100 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Digitalis with *forty cubic centimeters* of Diluted Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—1 Cc. (15 minims).

TINCTURA FERRI CHLORIDI

Tincture of Ferric Chloride

A hydro-alcoholic solution of Ferric Chloride [$FeCl_3 = 161.04$] containing not less than 13.28 percent. of the anhydrous salt, corresponding to 4.6 (4.58) percent. of metallic iron.

Solution of Ferric Chloride, *three hundred and fifty cubic centimeters*	350 Cc.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Solution with enough Alcohol to make *one thousand cubic centimeters*. Let the Tincture stand, in a closely covered vessel, protected from light, at least three months; then transfer it to glass-stoppered bottles, and keep it protected from light.

A bright, brownish liquid, having a slightly ethereal odor, a very astringent, styptic taste, and an acid reaction.

Specific gravity: about 1.005 at 25° C. (77° F.).

The Tincture yields a brownish-red precipitate with ammonia water, a blue one with potassium ferrocyanide T.S., and a white one, insoluble in nitric acid, with silver nitrate T.S.

After the Tincture has been exposed for some time to daylight, it yields a greenish or greenish-blue color with potassium ferricyanide T.S., showing the presence of some ferrous salt, due to reduction.

On adding a clear crystal of ferrous sulphate to a cooled mixture of equal volumes of concentrated sulphuric acid and a diluted portion of the Tincture (1 in 10), the crystal should not become colored brown, nor should there be a brownish-black zone developed around it (absence of *nitric acid*).

Evaporate 2.22 Gm. of the Tincture to dryness on a water-bath, add 2 Cc. of hydrochloric acid and 5 Cc. of solution of hydrogen dioxide, and again evaporate the mixture to dryness; dissolve the residue in 10 Cc. of water, pour the solution into a glass-stoppered bottle having a capacity of about 100 Cc., rinsing the vessel with 10 Cc. more of water, add 1 Cc. of hydrochloric acid and 1 Gm. of potassium iodide, and keep the mixture for half an hour at a temperature of 40° C. (104° F.), then cool and add a little starch T.S.; it should require not less than 18.3 Cc. of tenth-normal sodium thiosulphate V.S. to discharge the blue color of the liquid (each Cc. of the volumetric solution used indicating 0.25 percent. of metallic iron).

Average dose.—0.5 Cc. (8 minims).

TINCTURA GALLÆ

Tincture of Nutgall

Nutgall, in No. 40 powder, *two hundred grammes*	200 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix the Glycerin with *nine hundred cubic centimeters* of Alcohol. Introduce the Nutgall, without moistening it, into a glass percolator, shaking down the powder evenly and compactly, and pour on sufficient of the menstruum to saturate it and leave a stratum above it. Allow the percolation to proceed slowly, pouring on the remainder of the menstruum, and then sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA GAMBIR COMPOSITA

Compound Tincture of Gambir

[To replace Tinctura Catechu Composita, Pharm. 1890]

Gambir, in No. 50 powder, *fifty grammes*	50 Gm.
Saigon Cinnamon, in No. 50 powder, *twenty-five grammes*	25 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Macerate the Gambir and Saigon Cinnamon in a stoppered container, in a moderately warm place, with *seven hundred and fifty cubic centimeters* of Diluted Alcohol during forty-eight hours, with frequent agitation; then filter through purified cotton, or a plain filter, and, when the liquid has drained off completely, pass enough menstruum through the residue to make *one thousand cubic centimeters* of Tincture.

Average dose.— 4 Cc. (1 fluidrachm).

TINCTURA GELSEMII

Tincture of Gelsemium

Gelsemium, in No. 60 powder, *one hundred grammes*	100 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix *six hundred and fifty cubic centimeters* of Alcohol with *three hundred and fifty cubic centimeters* of Water. Moisten the Gelsemium with *thirty-five cubic centimeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 0.5 Cc. (8 minims).

TINCTURA GENTIANÆ COMPOSITA

Compound Tincture of Gentian

Gentian, *one hundred grammes*	100 Gm.
Bitter Orange Peel, *forty grammes*	40 Gm.
Cardamom, *ten grammes*	10 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *four hundred cubic centimeters* of Water. Reduce the Gentian, Bitter Orange Peel and Cardamom to a No. 40 powder, moisten this powder with *sixty cubic centimeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for twelve hours; then pack it moderately and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twelve hours; then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA GUAIACI

Tincture of Guaiac

Guaiac, in No. 40 powder, *two hundred grammes*	200 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Macerate the Guaiac in a stoppered container, in a moderately warm place, with *seven hundred and fifty cubic centimeters* of Alcohol during three days, with frequent agitation; then filter, and when the liquid has drained off, pour on enough Alcohol to make *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA GUAIACI AMMONIATA

Ammoniated Tincture of Guaiac

Guaiac, in No. 40 powder, *two hundred grammes*	200 Gm.
Aromatic Spirit of Ammonia, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Macerate the Guaiac in a stoppered container, in a moderately warm place, with *seven hundred and fifty cubic centimeters* of Aromatic Spirit of Ammonia during three days, with frequent agitation; then filter, and, when the liquid has drained off, pour on enough Aromatic Spirit of Ammonia to make *one thousand cubic centimeters* of Tincture.

Average dose.—2 Cc. (30 minims).

TINCTURA HYDRASTIS

Tincture of Hydrastis

Hydrastis, in No. 60 powder (containing not less than 2.5 percent. of hydrastine), *two hundred grammes*	200 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix Alcohol and Water in the proportion of *six hundred and fifty cubic centimeters* of Alcohol and *three hundred and fifty cubic centimeters* of Water. Moisten the Hydrastis with *sixty cubic centimeters* of the menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, gradually adding menstruum until *one thousand cubic centimeters* of percolate are obtained.

Tincture of Hydrastis, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.4 Gm. of hydrastine.

Assay of Tincture of Hydrastis

Transfer 100 Cc. of Tincture of Hydrastis to an evaporating dish, and evaporate it on a water-bath until the liquid measures about 10 Cc. If any insoluble matter has separated, add sufficient alcohol to dissolve it, and then assay the resulting liquid by the method given under *Fluidextractum Hydrastis* (page 190), using the same details as there directed for 10 Cc. of Fluidextract of Hydrastis, with the exception that the weight of the residual alkaloids must be multiplied by 2 instead of by 20 as there directed, to give the weight in grammes of hydrastine contained in *one hundred cubic centimeters* of Tincture of Hydrastis.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA HYOSCYAMI

Tincture of Hyoscyamus

Hyoscyamus, in No. 60 powder (containing not less than 0.08 percent. of mydriatic alkaloids), *one hundred grammes* . .	100 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Hyoscyamus with *forty cubic centimeters* of Diluted Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, gradually adding Diluted Alcohol until *one thousand cubic centimeters* are obtained.

Tincture of Hyoscyamus, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.007 Gm. of mydriatic alkaloids.

Assay of Tincture of Hyoscyamus

Transfer 100 Cc. of Tincture of Hyoscyamus to an evaporating dish, and evaporate it on a water-bath until it measures about 10 Cc. Add, if necessary, sufficient alcohol to dissolve any separated substance, and then assay the resulting liquid by the method given under *Fluidextractum Belladonnæ Radicis* (page 168), using the same details as there directed for 10 Cc. of Fluidextract of Belladonna Root, with the exception that the multiplication by 10 be omitted; the result will represent the weight in grammes of alkaloids contained in *one hundred cubic centimeters* of Tincture of Hyoscyamus.

Average dose.— 2 Cc. (30 minims).

TINCTURA IODI

Tincture of Iodine

Iodine, *seventy grammes*	70 Gm.
Potassium Iodide, *fifty grammes*	50 Gm.
Alcohol, *a sufficient quantity.*	
To make *one thousand cubic centimeters*	1000 Cc.

Triturate the Iodine and Potassium Iodide rapidly, in a mortar, to a coarse powder, and transfer it at once to a graduated bottle. Rinse the mortar with several successive portions of Alcohol, and pour the rinsings into the bottle. Then add Alcohol, shaking occasionally, until the Iodine and Potassium Iodide are dissolved, and the finished Tincture measures *one thousand cubic centimeters.*

If 5 Cc. of the Tincture be mixed with about 25 Cc. of water and titrated with tenth-normal sodium thiosulphate V.S., about 27.25 Cc. of tenth-normal sodium thiosulphate V.S. should be required for complete decolorization (corresponding to about 6.86 Gm. of Iodine in 100 Cc.).

Average dose.— 0.1 Cc. (1½ minims).

TINCTURA IPECACUANHÆ ET OPII

Tincture of Ipecac and Opium

Tincture of Deodorized Opium, *one thousand cubic centimeters*	1000 Cc.
Fluidextract of Ipecac, *one hundred cubic centimeters*	100 Cc.
Diluted Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Evaporate the Tincture of Deodorized Opium, in a tared dish on a water-bath, until it weighs *eight hundred grammes*. When it has become cold, add to it the Fluidextract of Ipecac, filter the mixture, and pass enough Diluted Alcohol through the filter to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—0.5 Cc. (8 minims).

TINCTURA KINO

Tincture of Kino

Kino, *fifty grammes*	50 Gm.
Purified Talc, *ten grammes*	10 Gm.
Glycerin, *one hundred and fifty cubic centimeters*	150 Cc.
Alcohol, *six hundred and fifty cubic centimeters*	650 Cc.
Water, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Glycerin with *two hundred cubic centimeters* of Water, and triturate the Kino and Purified Talc with sufficient of the mixture to produce a thin, smooth magma. Transfer this magma to a flask by the aid of the remainder of the mixture, and, having ascertained the weight of the flask and contents, heat it on a water-bath for about one hour; allow the flask and contents to cool, and restore the original weight by the addition of sufficient Water. Then add the Alcohol, mix, and pass the Tincture through a filter of purified cotton, keeping the funnel well covered. Finally, add sufficient Alcohol through the filter to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA KRAMERIÆ

Tincture of Krameria

Krameria, in No. 40 powder, *two hundred grammes*	200 Gm.
Diluted Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters*	1000 Cc.

Moisten the Krameria with *eighty cubic centimeters* of Diluted Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Diluted Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 4 Cc. (1 fluidrachm).

TINCTURA LACTUCARII

Tincture of Lactucarium

Lactucarium, *five hundred grammes*	**500 Gm.**
Glycerin, *two hundred and fifty cubic centimeters*	**250 Cc.**
Alcohol,	
Purified Petroleum Benzin,	
Diluted Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	**1000 Cc.**

Beat the Lactucarium in an iron mortar, with clean sand, to a coarse powder, and introduce it into a bottle; add *two thousand cubic centimeters* of Purified Petroleum Benzin, cork the bottle tightly, and set it aside for forty-eight hours, frequently agitating the mixture. Pour the mixture on a double filter, and allow it to drain. Wash the residue by gradually adding *fifteen hundred cubic centimeters* of Purified Petroleum Benzin, and allow the Lactucarium to dry by exposing it to a current of air. When it is dry and free from the odor of Benzin, reduce it to powder, using more sand, if necessary, and pack it moderately in a conical percolator. Mix the Glycerin with *two hundred cubic centimeters* of Water, and *five hundred cubic centimeters* of Alcohol, and moisten the powder with *five hundred cubic centimeters* of the mixture. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed very slowly, gradually adding, first the remainder of the menstruum, and then Diluted Alcohol, until the Lactucarium is exhausted. Reserve the first *seven hundred and fifty cubic centimeters* of the percolate, evaporate the remainder on a water-bath, at a temperature not exceeding 70° C. (158° F.), to *two hundred and fifty cubic centimeters*, and mix this with the reserved portion. Filter, and add enough Diluted Alcohol through the filter to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—2 Cc. (30 minims).

TINCTURA LAVANDULÆ COMPOSITA

Compound Tincture of Lavender

Oil of Lavender Flowers, *eight cubic centimeters*	8 Cc.
Oil of Rosemary, *two cubic centimeters*	2 Cc.
Saigon Cinnamon, *twenty grammes*	20 Gm.
Cloves, *five grammes*	5 Gm.
Myristica, *ten grammes*	10 Gm.
Red Saunders, *ten grammes*	10 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Reduce the Saigon Cinnamon, Cloves, Myristica and Red Saunders to a No. 50 powder, and macerate this powder for three days in a mixture of *seven hundred and fifty cubic centimeters* of Alcohol and *two hundred and fifty cubic centimeters* of Water, in which liquid the Oils have been dissolved. Then filter, and, when the liquid has drained off completely, pass enough of a mixture of Alcohol and Water, made in the same proportions as before, through the residue on the filter to make *one thousand cubic centimeters* of Tincture.

Average dose.—2 Cc. (30 minims).

TINCTURA LIMONIS CORTICIS

Tincture of Lemon Peel

Lemon Peel, from the fresh fruit, in thin shavings and cut into narrow shreds, *five hundred grammes*	500 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Macerate the Lemon Peel in a stoppered, wide-mouthed container, in a moderately warm place, with *one thousand cubic centimeters* of Alcohol during forty-eight hours, with frequent agitation; then filter through purified cotton, and, when the liquid has drained off completely, gradually pour on enough Alcohol to make *one thousand cubic centimeters* of Tincture, and filter.

TINCTURA LOBELIÆ

Tincture of Lobelia

Lobelia, in No. 50 powder, *one hundred grammes*	100 Gm.
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Lobelia with *forty cubic centimeters* of Diluted Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Diluted Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— { Expectorant, 1 Cc. (15 minims).
Emetic, 4 Cc. (1 fluidrachm).

TINCTURA MOSCHI

Tincture of Musk

Musk, *five grammes*	5 Gm.
Alcohol, *forty-five cubic centimeters*	45 Cc.
Water, *forty-five cubic centimeters*	45 Cc.
Diluted Alcohol, *a sufficient quantity,*	
To make *one hundred cubic centimeters* . .	100 Cc.

Triturate the Musk with the Water, a little at a time, until a smooth mixture is obtained; transfer this mixture to a bottle and allow it to stand twenty-four hours; add the Alcohol and macerate the mixture for six days, occasionally shaking it. Then filter through a plain paper filter, and, when the liquid has drained off completely, pass enough Diluted Alcohol through the filter to make *one hundred cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA MYRRHÆ

Tincture of Myrrh

Myrrh, in moderately coarse powder, *two hundred grammes* . .	200 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Macerate the Myrrh in a stoppered container, in a moderately warm place, with *seven hundred and fifty cubic centimeters* of Alcohol during three days, with frequent agitation; then filter through purified cotton, or a plain paper filter, and, when the liquid has drained off completely, pour on enough menstruum to make *one thousand cubic centimeters* of Tincture.

Average dose.—1 Cc. (15 minims).

TINCTURA NUCIS VOMICÆ

Tincture of Nux Vomica

Extract of Nux Vomica (containing 5 percent. of strychnine), *twenty grammes*	20 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Extract of Nux Vomica in a sufficient quantity of a mixture of Alcohol and Water, made in the proportion of *seven hundred and fifty cubic centimeters* of Alcohol and *two hundred and fifty cubic centimeters* of water, to make the solution measure *one thousand cubic centimeters*, and filter through a well covered filter.

Tincture of Nux Vomica, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.1 Gm. of strychnine.

Assay of Tincture of Nux Vomica

Transfer 100 Cc. of Tincture of Nux Vomica to a porcelain dish, evaporate it to dryness on a water-bath, and assay the resulting extract by the method given under *Extractum Nucis Vomicæ* (page 143), using the same details as there directed for 2 Gm. of Extract of Nux Vomica, with the exception that the multiplication by 50 be omitted; the result will represent the weight in grammes of strychnine contained in *one hundred cubic centimeters* of Tincture of Nux Vomica.

Average dose.—0.6 Cc. (10 minims).

TINCTURA OPII

Tincture of Opium Laudanum

Granulated Opium (containing 12 to 12.5 percent. of crystallizable morphine), *one hundred grammes*	100 Gm.
Alcohol,	
Water,	
Diluted Alcohol, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Heat *four hundred cubic centimeters* of water to boiling, and pour it on the Granulated Opium contained in a tared vessel, weigh, and stir occasionally during twelve hours; then restore the original weight by the addition of cold Water, add *four hundred cubic centimeters* of Alcohol, pour the mixture into a bottle, and continue the maceration for forty-eight hours, occasionally shaking. Transfer the mixture to a percolator, return the first portion of the percolate until it runs through clear, and, when the liquid ceases to drop, continue the percolation slowly, pouring on sufficient Diluted Alcohol until *one thousand cubic centimeters* are obtained.

Tincture of Opium, when assayed by the process given below, should contain in *one hundred cubic centimeters* not less than 1.2 nor more than 1.25 Gm. of crystallizable morphine.

Assay of Tincture of Opium

Tincture of Opium, *one hundred cubic centimeters*	100.0 Cc.
Ammonia Water, *three and one-half cubic centimeters* . . .	3.5 Cc.
Alcohol,	
Ether,	
Water,	
Lime Water, each, *a sufficient quantity*.	

Transfer 100 Cc. of Tincture of Opium to an evaporating dish and evaporate it on a water-bath to about 20 Cc., add 40 Cc. of water, mix thoroughly, and set the liquid aside for one hour, occasionally stirring to disintegrate the resinous flakes adhering to the dish. Then filter the liquid and wash the filter and residue with water, until all soluble matter is extracted (indicated by an almost colorless filtrate), and collect the washings separately. First evaporate the washings, in a tared dish, to a small volume, then add the first filtrate and evaporate the whole to a weight of 14 Gm.

Determine the morphine in this extract by the method given under Opium (page 329, twenty-first line of the Assay, beginning with the word "Rotate"), using the same details as there directed for 10 Gm. of Opium, with the exception that the final multiplication by 10 be omitted. The result will represent the weight in grammes of crystallized morphine yielded by *one hundred cubic centimeters* of Tincture of Opium.

Average dose.— 0.5 Cc. (8 minims).

TINCTURA OPII CAMPHORATA

Camphorated Tincture of Opium Paregoric

Powdered Opium, *four grammes*	4 Gm.
Benzoic Acid, *four grammes*	4 Gm.
Camphor, *four grammes*	4 Gm.
Oil of Anise, *four cubic centimeters*	4 Cc.
Glycerin, *forty cubic centimeters*	40 Cc.
Diluted Alcohol, *nine hundred and fifty cubic centimeters* . . .	950 Cc.
To make *one thousand cubic centimeters* . .	1000 Cc.

Place all the ingredients in a stoppered container and macerate for three days with frequent agitation; then filter the mixture through a well-covered paper filter, adding sufficient Diluted Alcohol through the filter to make *one thousand cubic centimeters* of Tincture.

Average dose.—8 Cc. (2 fluidrachms).

TINCTURA OPII DEODORATI

Tincture of Deodorized Opium

Granulated Opium containing 12 to 12.5 percent. of crystallizable morphine, *one hundred grammes*	100 Gm.
Purified Petroleum Benzin, *seventy-five cubic centimeters* . .	75 Cc.
Alcohol, *two hundred cubic centimeters*	200 Cc.
Water, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Heat *five hundred cubic centimeters* of Water to boiling, and pour it on the Granulated Opium contained in a suitable vessel, stirring the mixture frequently during twenty-four hours. Then transfer the mixture to a percolator, return the first portion of the percolate until it runs through clear, and, when the liquid ceases to drop, continue the percolation with Water until the Opium is exhausted. Concentrate the percolate by evaporation on a water-bath until it measures *one hundred and fifty cubic centimeters*, and, when cooled, shake it frequently and vigorously for ten minutes with *sixty-five cubic centimeters* of the Purified Petroleum Benzin. Separate the Benzin, repeat the shaking out for a few minutes with the remainder of the Benzin, and, having carefully and completely separated this second portion of Benzin, evaporate the remaining liquid in a warm place spontaneously, until the odor of Benzin has disappeared, removing the last traces by the heat of a water-bath. Mix the deodorized liquid so obtained with *six hundred cubic centimeters* of Water, filter the mixture through a paper filter, and, having mixed the Alcohol with the filtrate, wash the filter with sufficient Water to make *one thousand cubic centimeters* of Tincture.

Assay of Tincture of Deodorized Opium

If 100 Cc. of Tincture of Deodorized Opium be assayed by the process given under *Tinctura Opii* (page 475), it should yield not less than 1.2 nor more than 1.25 Gm. of crystallized morphine.

Average dose.—0.5 Cc. (8 minims).

TINCTURA PHYSOSTIGMATIS

Tincture of Physostigma

Physostigma, in No. 50 powder (containing 0.15 percent. of ether-soluble alkaloids), *one hundred grammes*	100 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Physostigma with *forty cubic centimeters* of Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Tincture of Physostigma, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.014 Gm. of the ether-soluble alkaloids from Physostigma.

Assay of Tincture of Physostigma

Transfer 100 Cc. of Tincture of Physostigma to a porcelain dish, evaporate it to dryness on a water-bath, and assay the resulting extract by the method given under *Extractum Physostigmatis* (page 146), using the same details as there directed for 1 Gm. of Extract of Physostigma, with the exception that the product must be multiplied by 2 instead of 200; the result will represent the weight in grammes of ether-soluble alkaloids from Physostigma contained in *one hundred cubic centimeters* of Tincture of Physostigma.

Average dose.— 1 Cc. (15 minims).

TINCTURA PYRETHRI

Tincture of Pyrethrum

Pyrethrum, in No. 50 powder, *two hundred grammes*	200 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Pyrethrum with *eighty cubic centimeters* of Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

TINCTURA QUASSIÆ

Tincture of Quassia

Quassia, in No. 50 powder, *two hundred grammes*	200 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *three hundred and fifty cubic centimeters* of Alcohol with *six hundred and fifty cubic centimeters* of Water. Moisten the Quassia with *sixty cubic centimeters* of this menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—2 Cc. (30 minims).

TINCTURA QUILLAJÆ

Tincture of Quillaja

Quillaja, in No. 20 powder, *two hundred grammes*	200 Gm.
Alcohol, *three hundred and fifty cubic centimeters*	350 Cc.
Water, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Boil the Quillaja in a covered vessel with *eight hundred cubic centimeters* of Water for fifteen minutes, strain while hot, and wash the residue on the strainer with *two hundred cubic centimeters* of Water, previously heated to boiling. Then evaporate the strained liquid to *six hundred cubic centimeters*, allow it to cool, add the Alcohol, and set it aside for twelve hours. Decant the clear liquid, filter it through paper, then pour the residue on the filter, and, when the liquid ceases to drop, wash the filter with sufficient Water to make *one thousand cubic centimeters* of Tincture.

TINCTURA RHEI

Tincture of Rhubarb

Rhubarb, *two hundred grammes*	200 Gm.
Cardamom, *forty grammes*	40 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Glycerin with *five hundred cubic centimeters* of Alcohol, and *four hundred cubic centimeters* of Water. Reduce the Rhubarb and Cardamom to a No. 40 powder, and moisten this powder with *ninety cubic centimeters* of this menstruum; transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for twelve hours; then pack it moderately and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on first the remainder of the menstruum, and then sufficient of a mixture of Alcohol and Water, made in the same proportions as before, to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 4 Cc. (1 fluidrachm).

TINCTURA RHEI AROMATICA

Aromatic Tincture of Rhubarb

Rhubarb, *two hundred grammes*	200 Gm.
Saigon Cinnamon, *forty grammes*	40 Gm.
Cloves, *forty grammes*	40 Gm.
Myristica, *twenty grammes*	20 Gm.
Glycerin, *one hundred cubic centimeters*	100 Cc.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix the Glycerin with *five hundred cubic centimeters* of Alcohol and *four hundred cubic centimeters* of Water. Reduce the Rhubarb, Saigon Cinnamon, Cloves and Myristica to a No. 40 powder, and moisten this powder with *ninety cubic centimeters* of this menstruum; transfer it to a percolator, and, without pressing the powder, allow it to stand for twelve hours; then pack it moderately and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on first the remainder of the menstruum, and then sufficient of a mixture of Alcohol and Water, made in the same proportions as before, to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—2 Cc. (30 minims).

TINCTURA SANGUINARIÆ

Tincture of Sanguinaria

Sanguinaria, in No. 60 powder, *one hundred grammes*	100 Gm.
Acetic Acid, *twenty cubic centimeters*	20 Cc.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred cubic centimeters* of Alcohol with *four hundred cubic centimeters* of Water. Moisten the Sanguinaria with the Acetic Acid and *thirty cubic centimeters* of this menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—1 Cc. (15 minims).

TINCTURA SCILLÆ

Tincture of Squill

Squill, in No. 20 powder, *one hundred grammes*	100 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water. Macerate the Squill with *six hundred cubic centimeters* of the menstruum, in a closed vessel, in a moderately warm place for three days, occasionally stirring, and express strongly. Repeat this operation with *three hundred cubic centi-*

meters of menstruum, macerating one day before expression; and, finally, macerate the residue for six hours in sufficient menstruum to make the united expressed liquids measure about *one thousand cubic centimeters.* Express as before, mix the expressed liquids, filter through paper, and pass sufficient menstruum through the filter to make *one thousand cubic centimeters* of Tincture.

Average dose.— 1 Cc. (15 minims).

TINCTURA SERPENTARIÆ

Tincture of Serpentaria

Serpentaria, in No. 50 powder, *two hundred grammes*	**200 Gm.**
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred and fifty cubic centimeters* of Alcohol with *three hundred and fifty cubic centimeters* of Water. Moisten the Serpentaria with *sixty cubic centimeters* of this menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 4 Cc. (1 fluidrachm).

TINCTURA STRAMONII

Tincture of Stramonium

Stramonium, in No. 60 powder (containing not less than 0.25 percent. of mydriatic alkaloids), *one hundred grammes* . .	**100 Gm.**
Diluted Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Stramonium with *forty cubic centimeters* of Diluted Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for three hours; then pack it firmly and pour on enough Diluted Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, gradually pouring on Diluted Alcohol until *one thousand cubic centimeters* are obtained.

Tincture of Stramonium, when assayed by the process given below, should contain in *one hundred cubic centimeters* 0.025 Gm. of mydriatic alkaloids from Stramonium.

Assay of Tincture of Stramonium

Transfer 100 Cc. of Tincture of Stramonium to an evaporating dish, and evaporate it on a water-bath until it measures about 10 Cc. Add, if necessary, sufficient alcohol to dissolve any separated substance, and then assay the resulting liquid by the method given under *Fluidextractum Belladonnæ Radicis* (page 168), using the same details as there directed for 10 Cc. of Fluidextract of Belladonna Root, with the exception that the multiplication by 10, as there directed, be omitted; the result will represent the weight in grammes of alkaloids contained in *one hundred cubic centimeters* of Tincture of Stramonium.

Average dose.—0.5 Cc. (8 minims).

TINCTURA STROPHANTHI

Tincture of Strophanthus

NOTE.—The strength of this tincture has been increased from 5 Gm. of Strophanthus in 100 Cc. to 10 Gm. of Strophanthus in 100 Cc.

Strophanthus, in No. 60 powder, *one hundred grammes* . . .	100 Gm.
Alcohol,	
Water, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred and fifty cubic centimeters* of Alcohol with *three hundred and fifty cubic centimeters* of Water. Moisten the Strophanthus with *fifty cubic centimeters* of this menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—0.5 Cc. (8 minims).

TINCTURA TOLUTANA

Tincture of Tolu

Balsam of Tolu, *two hundred grammes*	200 Gm.
Alcohol, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Macerate the Balsam of Tolu in *eight hundred cubic centimeters* of Alcohol, shaking frequently until dissolved; then filter through paper, and wash the filter with sufficient Alcohol to make *one thousand cubic centimeters* of Tincture.

Average dose.—2 Cc. (30 minims).

TINCTURA VALERIANÆ

Tincture of Valerian

Valerian, in No. 60 powder, *two hundred grammes*	200 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *seven hundred and fifty cubic centimeters* of Alcohol with *two hundred and fifty cubic centimeters* of Water. Moisten the Valerian with *sixty cubic centimeters* of this menstruum, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient menstruum to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—4 Cc. (1 fluidrachm).

TINCTURA VALERIANÆ AMMONIATA

Ammoniated Tincture of Valerian

Valerian, in No. 60 powder, *two hundred grammes*	200 Gm.
Aromatic Spirit of Ammonia, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Valerian with *sixty cubic centimeters* of Aromatic Spirit of Ammonia, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Aromatic Spirit of Ammonia to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Aromatic Spirit of Ammonia to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—2 Cc. (30 minims).

TINCTURA VANILLÆ

Tincture of Vanilla

Vanilla, cut into small pieces and bruised, *one hundred grammes*	100 Gm.
Sugar, in coarse powder, *two hundred grammes*	200 Gm.
Alcohol,	
Water, each, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix *six hundred and fifty cubic centimeters* of Alcohol with *three hundred and fifty cubic centimeters* of Water. Macerate the Vanilla in *five hundred cubic centimeters* of the mixture for twelve hours; then drain off the liquid and set it aside. Transfer the Vanilla to a mortar, beat it with the Sugar into a uniform powder, then pack it in a percolator and pour upon it the reserved liquid. When this has disappeared from the surface, continue the percolation by gradually pouring on sufficient menstruum to make *one thousand cubic centimeters* of Tincture.

TINCTURA VERATRI

Tincture of Veratrum

[TINCTURA VERATRI VIRIDIS, PHARM. 1890]

NOTE.—The strength of this tincture has been reduced from 40 Gm. of Veratrum Viride in 100 Cc. to 10 Gm. of Veratrum in 100 Cc.

Veratrum, in No. 60 powder, *one hundred grammes*	100 Gm.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Veratrum with *forty cubic centimeters* of Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.—1 Cc. (15 minims).

TINCTURA ZINGIBERIS

Tincture of Ginger

Ginger, in No. 50 powder, *two hundred grammes*	200 Gm.
Alcohol, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Moisten the Ginger with *sixty cubic centimeters* of Alcohol, transfer it to a percolator, and, without pressing the powder, allow it to stand, well covered, for six hours; then pack it firmly and pour on enough Alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly, pouring on sufficient Alcohol to obtain *one thousand cubic centimeters* of Tincture.

Average dose.— 2 Cc. (30 minims).

TINCTURÆ HERBARUM RECENTIUM

Tinctures of Fresh Herbs

Tinctures of Fresh Herbs, when not otherwise directed, are to be prepared according to the following formula:

The Fresh Herb, cut, bruised, or crushed, *five hundred grammes*	500 Gm.
Alcohol, *one thousand cubic centimeters*	1000 Cc.

Macerate the Herb with the Alcohol in a closed vessel in a moderately warm place during fourteen days, with occasional stirring; then strongly express the liquid and filter it through paper.

TRAGACANTHA

Tragacanth

A gummy exudation from *Astragalus gummifer* Labillardière, or from other species of *Astragalus* (Fam. *Leguminosæ*).

In ribbon-shaped bands varying in size and from 1 to 3 Mm. thick, or in irregular pieces of the same, long and linear, straight or spirally twisted; externally whitish, marked by more or less pronounced longitudinal or excentric lines or ridges; translucent, horny, fracture short, tough, rendered more easily pulverizable by a heat of 50° C. (122° F.).

On treating Tragacanth with 50 parts of water, it swells and gradually forms a cloudy, gelatinous mass, which, on warming with solution of sodium hydroxide on a water-bath, becomes yellow and is tinged blue on the addition of iodine T.S.; the addition of alcohol to the fluid portion causes a precipitate, but the liquid is not colored blue by iodine T.S.

TRITICUM

Triticum

The dried rhizome of *Agropyron repens* (Linné) Beauvois (Fam. *Gramineæ*), gathered in the spring.

Of horizontal growth, subcylindrical, 1 to 2 Mm. in diameter, usually cut into sections 5 to 8 Mm. long; externally brownish-yellow to straw-colored, nearly smooth; hollow in the centre; odor slight; taste distinctly sweet.

Average dose.—8 Gm. (120 grains).

TRITURATIONES

Triturations

Unless otherwise directed, Triturations are to be prepared according to the following formula:

Take of

The Substance, *ten grammes*	10 Gm.
Sugar of Milk, in moderately fine powder, *ninety grammes* . .	90 Gm.
To make *one hundred grammes* . .	100 Gm.

Weigh the Substance and the Sugar of Milk, separately; then place the Substance, previously reduced, if necessary, to a moderately fine powder, in a mortar; add about an equal measure of Sugar of Milk, mix well by means of a spatula, and triturate the powders thoroughly together. Then add fresh portions of the Sugar of Milk, from time to time, until the whole is added, and continue the trituration after each addition until the Substance is intimately mixed with the Sugar of Milk and reduced to a fine powder.

TRITURATIO ELATERINI

Trituration of Elaterin

Elaterin, *ten grammes*	10 Gm.
Sugar of Milk, in moderately fine powder, *ninety grammes* . .	90 Gm.
To make *one hundred grammes* . .	100 Gm.

Mix them thoroughly by trituration.

Average dose.—0.030 Gm. = 30 milligrammes ($\frac{1}{2}$ grain).

TROCHISCI ACIDI TANNICI

Troches of Tannic Acid

Tannic Acid, *six grammes*	6 Gm.
Sugar, in fine powder, *sixty-five grammes*	65 Gm.
Tragacanth, in fine powder, *two grammes*	2 Gm.
Stronger Orange Flower Water, *a sufficient quantity,*	
To make *one hundred troches* . .	100

Rub the powders together until they are thoroughly mixed; then, with Stronger Orange Flower Water, form a mass, to be divided into *one hundred troches.*

TROCHISCI AMMONII CHLORIDI

Troches of Ammonium Chloride

Ammonium Chloride, in fine powder, *ten grammes*	10 Gm.
Extract of Glycyrrhiza, in fine powder, *twenty grammes* . . .	20 Gm.
Tragacanth, in fine powder, *two grammes*	2 Gm.
Sugar, in fine powder, *forty grammes*	40 Gm.
Syrup of Tolu, *a sufficient quantity,*	
To make *one hundred troches* . .	100

Rub the powders together until they are thoroughly mixed; then, with Syrup of Tolu, form a mass, to be divided into *one hundred troches.*

TROCHISCI CUBEBÆ

Troches of Cubeb

Oleoresin of Cubeb, *two grammes*	2 Gm.
Oil of Sassafras, *one cubic centimeter*	1 Cc.
Extract of Glycyrrhiza, in fine powder, *twenty-five grammes* . .	25 Gm.
Acacia, in fine powder, *twelve grammes*	12 Gm.
Syrup of Tolu, *a sufficient quantity,*	
To make *one hundred troches* . .	100

Rub the powders together until they are thoroughly mixed; then add the Oleoresin and the Oil, and incorporate them with the mixture. Lastly, with Syrup of Tolu, form a mass, to be divided into *one hundred troches.*

TROCHISCI GAMBIR

Troches of Gambir

[To replace TROCHISCI CATECHU, PHARM. 1890]

Gambir, in fine powder, *six grammes*	6 Gm.
Sugar, in fine powder, *sixty-five grammes*	65 Gm.
Tragacanth, in fine powder, *two grammes*	2 Gm.
Stronger Orange Flower Water, *a sufficient quantity,*	
To make *one hundred troches* . .	100

Rub the powders together until they are thoroughly mixed; then, with Stronger Orange Flower Water, form a mass, to be divided into *one hundred troches.*

TROCHISCI GLYCYRRHIZÆ ET OPII

Troches of Glycyrrhiza and Opium

Extract of Glycyrrhiza, in fine powder, *fifteen grammes*	15.0 Gm.
Powdered Opium, *one-half gramme*	0.5 Gm.
Acacia, in fine powder, *twelve grammes*	12.0 Gm.
Sugar, in fine powder, *twenty grammes*	20.0 Gm.
Oil of Anise, *two-tenths of a cubic centimeter*	0.2 Cc.
Water, *a sufficient quantity*,	
To make *one hundred troches*	100

Rub the powders together until they are thoroughly mixed; then add the Oil of Anise (equivalent to about 4 drops), and incorporate it with the mixture. Lastly, with Water, form a mass, to be divided into *one hundred troches*.

TROCHISCI KRAMERIÆ

Troches of Krameria

Extract of Krameria, *six grammes*	6 Gm.
Sugar, in fine powder, *sixty-five grammes*	65 Gm.
Tragacanth, in fine powder, *two grammes*	2 Gm.
Stronger Orange Flower Water, *a sufficient quantity*,	
To make *one hundred troches*	100

Rub the powders together until they are thoroughly mixed; then, with Stronger Orange Flower Water, form a mass, to be divided into *one hundred troches*.

TROCHISCI POTASSII CHLORATIS

Troches of Potassium Chlorate

Potassium Chlorate, in fine powder, *fifteen grammes*	15 Gm.
Sugar, in fine powder, *sixty grammes*	60 Gm.
Tragacanth, in fine powder, *three grammes*	3 Gm.
Water, *a sufficient quantity*,	
To make *one hundred troches*	100

Mix the Sugar with the Tragacanth by trituration, in a mortar; then transfer the mixture to a sheet of paper, and by means of a bone spatula mix with it the Potassium Chlorate, being careful, by avoiding trituration or pressure, to prevent the mixture from igniting or exploding. Lastly, with Water, form a mass, to be divided into *one hundred troches.*

TROCHISCI SANTONINI

Troches of Santonin

Santonin, in fine powder, *three grammes*	3 Gm.
Sugar, in fine powder, *ninety grammes*	90 Gm.
Tragacanth, in fine powder, *three grammes*	3 Gm.
Stronger Orange Flower Water, *a sufficient quantity,*	
To make *one hundred troches* . .	100

Rub the powders together until they are thoroughly mixed; then, with Stronger Orange Flower Water, form a mass, to be divided into *one hundred troches.*

Troches of Santonin should be kept in dark amber-colored vials.

TROCHISCI SODII BICARBONATIS

Troches of Sodium Bicarbonate

Sodium Bicarbonate, *eighteen grammes*	18 Gm.
Sugar, in fine powder, *fifty-four grammes*	54 Gm.
Myristica, bruised, *one gramme*	1 Gm.
Mucilage of Tragacanth, *a sufficient quantity,*	
To make *one hundred troches* . .	100

Triturate the Myristica with the Sugar, gradually added, until they are reduced to a fine powder, and mix this intimately with the Sodium Bicarbonate; then, with the Mucilage of Tragacanth, form a mass, to be divided into *one hundred troches.*

ULMUS

Elm

The dried bark of *Ulmus fulva* Michaux (Fam. *Ulmaceæ*), deprived of its periderm.

In flat pieces varying in length and width, 3 to 4 Mm. thick; outer surface light brown, with occasional dark brown patches of the periderm; inner surface yellowish-brown; fracture fibrous and somewhat mealy; odor slight but distinct; taste mucilaginous.

Ground Elm contains a few nearly spherical starch grains from 0.005 to 0.010 Mm. in diameter.

UNGUENTUM

Ointment

White Wax, *two hundred grammes*	200 Gm.
Benzoinated Lard, *eight hundred grammes*	800 Gm.
To make *one thousand grammes*	1000 Gm.

Melt the White Wax, add the Benzoinated Lard, and heat gently until liquefied; then stir the mixture until it congeals.

UNGUENTUM ACIDI BORICI

Ointment of Boric Acid

Boric Acid, in fine powder, *one hundred grammes*	100 Gm.
Paraffin, *one hundred grammes*	100 Gm.
White Petrolatum, *eight hundred grammes*	800 Gm.
To make *one thousand grammes*	1000 Gm.

Melt the Paraffin, add the White Petrolatum, and heat gently for ten minutes. Then gradually add the hot liquid to the Boric Acid, contained in a warm mortar, triturating thoroughly, and stir the mixture until it congeals.

UNGUENTUM ACIDI TANNICI

Ointment of Tannic Acid

Tannic Acid, *twenty grammes*	20 Gm.
Glycerin, *twenty grammes*	20 Gm.
Ointment, *sixty grammes*	60 Gm.
To make *one hundred grammes*	100 Gm.

Dissolve the Tannic Acid in the Glycerin, with the aid of a gentle heat, and mix the solution thoroughly with the Ointment in a mortar, avoiding the use of iron utensils.

UNGUENTUM AQUÆ ROSÆ

Ointment of Rose Water

Spermaceti, *one hundred and twenty-five grammes*	125 Gm.
White Wax, *one hundred and twenty grammes*	120 Gm.
Expressed Oil of Almond, *five hundred and sixty grammes*	560 Gm.
Sodium Borate, in fine powder, *five grammes*	5 Gm.
Stronger Rose Water, *one hundred and ninety grammes*	190 Gm.
To make about *one thousand grammes*	1000 Gm.

Reduce the Spermaceti and the White Wax to fine shavings and melt them at a moderate heat, add the Expressed Oil of Almond and stir, continuing the heat until the mixture is uniform; then gradually add the Stronger Rose Water, previously warmed, and in which the Sodium Borate has been dissolved, stirring the mixture rapidly and continuously until it congeals and becomes of uniform consistence.

When this Ointment is to be used as a vehicle for metallic salts, the Sodium Borate should be omitted.

UNGUENTUM BELLADONNÆ

Belladonna Ointment

Extract of Belladonna Leaves, *ten grammes*	10 Gm.
Diluted Alcohol, *five cubic centimeters*	5 Cc.
Hydrous Wool-Fat, *twenty grammes*	20 Gm.
Benzoinated Lard, *sixty-five grammes*	65 Gm.
To make about *one hundred grammes*	100 Gm.

Triturate the Extract with the Diluted Alcohol until a smooth mixture is obtained; with this incorporate the Hydrous Wool-Fat; then add the Benzoinated Lard and mix thoroughly.

UNGUENTUM CHRYSAROBINI

Chrysarobin Ointment

Chrysarobin, *six grammes*	6 Gm.
Benzoinated Lard, *ninety-four grammes*	94 Gm.
To make about *one hundred grammes*	100 Gm.

Triturate the Chrysarobin with the Benzoinated Lard, previously melted, and heat the mixture on a water-bath with occasional stirring for twenty minutes; then strain and stir until it congeals.

UNGUENTUM DIACHYLON

Diachylon Ointment

Lead Plaster, *fifty grammes*	50 Gm.
Oil of Lavender Flowers, *one gramme*	1 Gm.
Olive Oil, *forty-nine grammes*	49 Gm.
To make *one hundred grammes*	100 Gm.

Melt the Lead Plaster by applying a gentle heat, add the Olive Oil, and mix thoroughly; then allow the mixture to cool, add the Oil of Lavender Flowers, and stir the ointment until it congeals. It should be prepared extemporaneously.

UNGUENTUM GALLÆ

Nutgall Ointment

Nutgall, in very fine powder, *twenty grammes*	20 Gm.
Ointment, *eighty grammes*	80 Gm.
To make *one hundred grammes* . .	100 Gm.

Rub the Nutgall with the Ointment, gradually added, until they are thoroughly mixed. Avoid the use of metallic utensils.

UNGUENTUM HYDRARGYRI

Mercurial Ointment

Mercury, *five hundred grammes*	500 Gm.
Oleate of Mercury, *twenty grammes*	20 Gm.
Prepared Suet, *two hundred and thirty grammes*	230 Gm.
Benzoinated Lard, *two hundred and fifty grammes*	250 Gm.
To make *one thousand grammes* . .	1000 Gm.

Triturate the Oleate of Mercury in a warm mortar, add the Mercury gradually by means of a pipette, and when the globules are completely divided and distributed, set it aside for about fifteen minutes. Melt the Lard and Suet, allow the mixture to partially cool, and add about *twenty-five grammes* of it to the mercurial mixture, and continue the trituration until globules are no longer visible under a lens magnifying ten diameters. Then add the remainder of the Lard and Suet and mix thoroughly.

Assay of Mercurial Ointment

Weigh 10 Gm. of Mercurial Ointment in a tared dish, melt it, then remove it from the fire and add 50 Cc. of warm petroleum benzin. Stir the mixture well, allow the Mercury to settle completely, and decant the petroleum benzin. Wash the residue with successive portions of 10 Cc. each of warm petroleum benzin until it is entirely free from fatty matter, carefully retain all of the separated Mercury in the dish, and allow all traces of the benzin to evaporate. Add to the residue 10 Cc. of diluted hydrochloric acid, heat it gently and stir with a glass rod until the Mercury collects in a globule. Pour off the acid, warm the Mercury with a little distilled water, dry the globule on bibulous paper, and weigh. The Mercury should weigh not less than 4.9 Gm.

UNGUENTUM HYDRARGYRI AMMONIATI

Ointment of Ammoniated Mercury

Ammoniated Mercury, in very fine powder, *ten grammes* . .	10 Gm.
White Petrolatum, *fifty grammes*	50 Gm.
Hydrous Wool-Fat, *forty grammes*	40 Gm.
To make *one hundred grammes* . .	100 Gm.

Rub the Ammoniated Mercury with an equal weight of the melted White Petrolatum, then add the remainder of the melted White Petrolatum, mix thoroughly with the Hydrous Wool-Fat, and stir the mixture until it congeals.

UNGUENTUM HYDRARGYRI DILUTUM

Blue Ointment

Mercurial Ointment, *six hundred and seventy grammes* . . .	670 Gm.
Petrolatum, *three hundred and thirty grammes*	330 Gm.
To make *one thousand grammes* . .	1000 Gm.

Mix them thoroughly.

UNGUENTUM HYDRARGYRI NITRATIS

Ointment of Mercuric Nitrate

Mercury, *seventy grammes*	70 Gm.
Nitric Acid, *one hundred and seventy-five grammes*	175 Gm.
Lard, free from water, *seven hundred and sixty grammes*	760 Gm.
To make about *one thousand grammes* . .	1000 Gm.

Heat the Lard in a capacious glass or porcelain vessel to a temperature of 105° C. (221° F.), then withdraw the heat and gradually add *seventy grammes* of the Nitric Acid. When the reaction moderates, reapply the heat until effervescence ceases, and allow the mixture to cool to about 40° C. (104° F.). Having dissolved the Mercury in the remainder of the Nitric Acid, using sufficient heat to prevent the solution from crystallizing, add this solution to the Lard mixture. When the mass begins to congeal, stir it thoroughly with a wooden spatula, until it is of a bright citrine color. Contact with metallic utensils should be avoided.

UNGUENTUM HYDRARGYRI OXIDI FLAVI

Ointment of Yellow Mercuric Oxide

Yellow Mercuric Oxide, in very fine powder, *ten grammes* . .	10 Gm.
Water, *ten grammes*	10 Gm.
Hydrous Wool-Fat, *forty grammes*	40 Gm.
Petrolatum, *forty grammes*	40 Gm.
To make *one hundred grammes* . .	100 Gm.

Triturate the Yellow Mercuric Oxide with the Water until the mixture is perfectly smooth, then add the Hydrous Wool-Fat in divided portions and incorporate the whole with the Petrolatum, avoiding contact with metallic utensils.

UNGUENTUM HYDRARGYRI OXIDI RUBRI

Ointment of Red Mercuric Oxide

Red Mercuric Oxide, in very fine powder, ten grammes	10 Gm.
Water, ten grammes	10 Gm.
Hydrous Wool-Fat, forty grammes	40 Gm.
Petrolatum, forty grammes	40 Gm.
To make one hundred grammes	100 Gm.

Triturate the Red Mercuric Oxide with the Water until the mixture is perfectly smooth and absolutely free from gritty particles, then add the Hydrous Wool-Fat in divided portions and incorporate thoroughly with the Petrolatum. Contact with metallic utensils should be avoided.

UNGUENTUM IODI

Iodine Ointment

Iodine, four grammes	4 Gm.
Potassium Iodide, four grammes	4 Gm.
Glycerin, twelve grammes	12 Gm.
Benzoinated Lard, eighty grammes	80 Gm.
To make one hundred grammes	100 Gm.

Triturate the Iodine and Potassium Iodide in a glass mortar with the Glycerin until dissolved, then gradually incorporate the Benzoinated Lard and mix thoroughly, avoiding the use of a metallic spatula. This Ointment should be freshly made when required.

UNGUENTUM IODOFORMI

Iodoform Ointment

Iodoform, in very fine powder, ten grammes	10 Gm.
Lard, ninety grammes	90 Gm.
To make one hundred grammes	100 Gm.

Triturate the Iodoform thoroughly with about twice its weight of the Lard, then incorporate the remainder of the Lard.

UNGUENTUM PHENOLIS

Ointment of Phenol

[UNGUENTUM ACIDI CARBOLICI, PHARM. 1890]

Phenol, *three grammes*	3 Gm.
White Petrolatum, *ninety-seven grammes*	97 Gm.
To make *one hundred grammes*	100 Gm.

To the melted White Petrolatum add the Phenol, and stir the mixture until it begins to congeal.

UNGUENTUM PICIS LIQUIDÆ

Tar Ointment

Tar, *five hundred grammes*	500 Gm.
Yellow Wax, *one hundred and fifty grammes*	150 Gm.
Lard, *three hundred and fifty grammes*	350 Gm.
To make *one thousand grammes*	1000 Gm.

Melt the Yellow Wax, add the Lard, and to the melted mixture add the Tar, previously warmed, and incorporate thoroughly; strain through muslin, and stir the mixture until it congeals.

UNGUENTUM POTASSII IODIDI

Ointment of Potassium Iodide

Potassium Iodide, *ten grammes*	10.0 Gm.
Potassium Carbonate, *six-tenths of a gramme*	0.6 Gm.
Water, *ten grammes*	10.0 Gm.
Benzoinated Lard, *eighty grammes*	80.0 Gm.
To make about *one hundred grammes*	100 Gm.

Dissolve the Potassium Iodide and Potassium Carbonate in the Water by trituration, then gradually add the Benzoinated Lard and incorporate thoroughly. This Ointment should be prepared extemporaneously.

UNGUENTUM STRAMONII

Stramonium Ointment

Extract of Stramonium, *ten grammes*	10 Gm.
Diluted Alcohol, *five cubic centimeters*	5 Cc.
Hydrous Wool-Fat, *twenty grammes*	20 Gm.
Benzoinated Lard, *sixty-five grammes*	65 Gm.
To make about *one hundred grammes*	100 Gm.

Triturate the Extract with the Diluted Alcohol until a smooth mixture is obtained; with this incorporate the Hydrous Wool-Fat, then add the Benzoinated Lard, and mix thoroughly.

UNGUENTUM SULPHURIS

Sulphur Ointment

Washed Sulphur, *one hundred and fifty grammes*	150 Gm.
Benzoinated Lard, *eight hundred and fifty grammes*	850 Gm.
To make *one thousand grammes* . .	1000 Gm.

Rub the Washed Sulphur with the Benzoinated Lard, gradually added, until they are thoroughly mixed.

UNGUENTUM VERATRINÆ

Veratrine Ointment

Veratrine, *four grammes*	4 Gm.
Expressed Oil of Almond, *six grammes*	6 Gm.
Benzoinated Lard, *ninety grammes*	90 Gm.
To make *one hundred grammes* . .	100 Gm.

Rub the Veratrine with the Expressed Oil of Almond, then gradually add the Benzoinated Lard, and mix thoroughly.

UNGUENTUM ZINCI OXIDI

Ointment of Zinc Oxide

Zinc Oxide, in very fine powder, *two hundred grammes* . . .	200 Gm.
Benzoinated Lard, *eight hundred grammes*	800 Gm.
To make *one thousand grammes* . . .	1000 Gm.

Rub the Zinc Oxide, which must be free from gritty particles, with an equal weight of the melted Benzoinated Lard, and with this incorporate the remainder of the Benzoinated Lard, previously melted; if necessary, strain the Ointment while warm, and stir thoroughly until it congeals.

UNGUENTUM ZINCI STEARATIS

Ointment of Zinc Stearate

Zinc Stearate, in fine powder, *fifty grammes*	50 Gm.
White Petrolatum, *fifty grammes*	50 Gm.
To make *one hundred grammes* . .	100 Gm.

To the White Petrolatum, melted on a water-bath, add the Zinc Stearate. Continue the heat until the mixture becomes smooth, then stir while cooling, until it congeals.

UVA URSI

Uva Ursi

The dried leaves of *Arctostaphylos Uva-ursi* (Linné) Sprengel (Fam. *Ericaceæ*).

Obovate or oblong-spatulate, 15 to 30 Mm. long, obtuse, slightly revolute on the margin, tapering into a very short and stout petiole, coriaceous; upper surface dark green, finely reticulate; lower surface slightly pubescent; odor slight; taste strongly astringent and somewhat bitter.

Average dose.— 2 Gm. (30 grains).

VALERIANA

Valerian

The dried rhizome and roots of *Valeriana officinalis* Linné (Fam. *Valerianaceæ*).

Rhizome from 2 to 4 Cm. long, and 1 to 2 Cm. thick, upright, subglobular or obconical, truncate at both ends, brown or yellowish-brown, internally whitish or pale brownish, with a narrow circle of white wood under the thin bark. Roots numerous, slender, brittle, brown, with a thick bark, and slender, ligneous cord. Odor peculiar, becoming stronger and more unpleasant on keeping the drug; taste camphoraceous and somewhat bitter.

Average dose.— 2 Gm. (30 grains).

VANILLA

Vanilla

The cured, full grown, but immature fruit of *Vanilla planifolia* Andrews (Fam. *Orchidaceæ*).

Linear, narrowed, and bent or hooked at the rather oblique base, about 15 to 25 Cm. long and about 7 Mm. thick; externally blackish-brown, longitudinally wrinkled, glossy, frequently covered with an efflorescence of vanillin in acicular crystals, flexible and tough, 1-celled, containing a blackish-brown pulp and numerous minute, blackish, ovoid and flattened seeds; odor and taste characteristic and very agreeable.

Average dose.— 1 Gm. (15 grains).

VANILLINUM

Vanillin

$C_8H_8O_3 = 150.92$

Methylprotocatechuic aldehyde [$C_6H_3.OH.OCH_3.COH$ 4:3:1], occurring naturally in vanilla, or made artificially from several ortho-dihydroxybenzene derivatives.

Fine, white, crystalline needles, having the odor and taste of vanilla, and having an acid reaction.

Soluble in about 100 parts of water at 25° C. (77° F.), and in 15 parts at 80° C. (176° F.). It is easily soluble in alcohol, ether, glycerin, or chloroform.

When heated to between 80° and 81° C. (176° and 177.8° F.), it melts, and at 285° C. (545° F.) it can be distilled without decomposition in a current of carbon dioxide, leaving no residue.

It is easily soluble in aqueous solutions of alkali hydroxides, and from the combinations thus formed it is precipitated at once by the addition of acids.

An aqueous solution of Vanillin gives, with ferric chloride T.S., a blue color; if the mixture be boiled, the blue color changes to brown, and on cooling a white precipitate of dihydro-divanillin separates.

Vanillin is extracted completely from its solution in ether by shaking with a saturated aqueous solution of sodium bisulphite, from which solution it is precipitated by the addition of sulphuric acid.

An aqueous solution of Vanillin will give, on the addition of lead acetate T.S., a white precipitate of a lead compound of vanillin, soluble in hot water, and crystallizing, on cooling, in scales.

On warming 0.1 Gm. of Vanillin with concentrated alcoholic solution of sodium hydroxide, adding chloroform and again warming, it should not give an odor of phenyl-isocyanide (absence of *acetanilide*).

Average dose.—0.030 Gm. = 30 milligrammes (½ grain).

VERATRINA

Veratrine

A mixture of alkaloids obtained from the seed of *Asagræa officinalis* (Chamisso and Schlechtendal) Lindley (Fam. *Liliaceæ*). It should be kept in well-stoppered, amber-colored vials.

A white, or grayish-white, amorphous powder, odorless, but causing intense irritation and sneezing when even a minute quantity reaches the nasal mucous membrane; having an acrid taste, and leaving a sensation of tingling and numbness on the tongue. *It should be tasted with great caution.* Slightly hygroscopic in moist air.

Soluble in 1750 parts of water, 2.2 parts of alcohol, 3 parts of ether, and in 1 part of chloroform at 25° C. (77° F.); soluble in 1300 parts of water at 80° C. (176° F.); very soluble in benzene and amyl alcohol; insoluble in petroleum benzin.

When heated to 145° C. (293° F.), it softens, and melts at 152° C. (305.6° F.). Upon ignition it is consumed, leaving no residue.

Its alcoholic solutions are alkaline to red litmus paper.

On triturating Veratrine with sulphuric acid, in a glass mortar, the yellow or orange-red solution exhibits, by reflected light, a greenish fluorescence, which becomes more intense upon the addition of an equal volume of acid. Upon standing, the solution gradually assumes a deep red color.

Sulphuric acid when heated with Veratrine gives a cherry-red color. Sulphuric acid containing a trace of selenous acid produces a brownish-green color. Sulphuric acid added to a mixture of 1 part of Veratrine and 6 parts of sugar produces a green color, changing to blue, and the mixture then becomes colorless.

Average dose.— 0.002 Gm. = 2 milligrammes ($\frac{1}{30}$ grain).

VERATRUM

Veratrum

[VERATRUM VIRIDE, PHARM. 1890]

The dried rhizome and roots of *Veratrum viride* Aiton (American Hellebore) or *Veratrum album* Linné (White Hellebore) (Fam. *Liliaceæ*).

Rhizome upright, ovoid or obconical, 2.5 to 7 Cm. long and 2 to 5 Cm. thick, externally light to dark brown or blackish, frequently bearing at the summit some coarsely fibrous remains of leaf bases; internally grayish- or yellowish-white, showing numerous short, irregular wood-bundles. Roots emanating from all sides of the rhizome, numerous, shrivelled, whitish or light yellowish-brown, from 10 to 20 Cm. long, and 1 to 2 Mm. thick. Inodorous, but strongly sternutatory when powdered; taste bitterish and very acrid.

Average dose.— 0.125 Gm. = 125 milligrammes (2 grains).

VIBURNUM OPULUS

Viburnum Opulus

The dried bark of *Viburnum Opulus* Linné (Fam. *Caprifoliaceæ*).

In somewhat transversely curved pieces, occasionally in quills, of variable length, and 0.5 to 2 Mm. thick; outer surface grayish-brown, longitudinally wrinkled, with large brown lenticels and brownish-black fruit-heads of a lichen; inner surface light brown, longitudinally striate; fracture uneven, fibrous; transverse sections showing several bands of bast fibres; odor slight; taste somewhat astringent and bitter.

Average dose.— 2 Gm. (30 grains).

VIBURNUM PRUNIFOLIUM

Viburnum Prunifolium

The dried bark of the root of *Viburnum prunifolium* Linné, or of *Viburnum Lentago* Linné (Fam. *Caprifoliaceæ*).

In irregular or quilled pieces, rarely exceeding 4 Mm. thick; externally dingy brown, shallowly fissured and slightly scaly; inner surface rust-brown; fracture weak, short, and uneven, the inner layer whitish, the middle rust-brown, the outer dark brown; groups of stone cells readily distinguishable in transverse section; odor slight, peculiar; taste very bitter, somewhat astringent.

Average dose.—2 Gm. (30 grains).

VINUM ALBUM

White Wine

An alcoholic liquid, made by fermenting the juice of fresh grapes, the fruit of *Vitis vinifera* Linné (Fam. *Vitaceæ*), freed from seeds, stems, and skins, and subjected to the usual cellar-treatment for fining and aging.

When White Wine is prescribed without further specification, it is recommended that a dry White Wine of domestic production be employed.

White Wine should be preserved in well-closed casks filled as full as possible, or in well-stoppered bottles, in a cool place.

A pale amber-colored or straw-colored liquid, having a pleasant odor free from yeastiness, and a fruity, agreeable, slightly spirituous taste without excessive sweetness or acidity.

The specific gravity, at 15.6° C. (60° F.), should be not less than 0.990, nor more than 1.010.

If a portion of White Wine be evaporated, the residue, when dried during twelve hours on a water-bath, should amount to not less than 1.5 nor more than 3 percent.; this residue ignited at a low temperature and burned gradually to whiteness, moistened with a small portion of ammonium carbonate T.S., and again carefully ignited, should weigh not less than 0.14 Gm. nor more than 0.26 Gm. for each 100 Cc. of White Wine tested.

To neutralize 50 Cc. of White Wine should require not less than 3 nor more than 5.2 Cc. of normal potassium hydroxide V.S. (limit of *free acid*), litmus T.S. being used as indicator.

If 10 Cc. of White Wine be diluted with an equal volume of water, and treated with 5 drops of ferric chloride T.S., only a faint, greenish-brown color should make its appearance (absence of more than traces of *tannic acid*).

If 75 Cc. of White Wine be acidified with 5 Cc. of diluted sulphuric acid (1 in 3), and thoroughly shaken in a separator with a mixture of equal parts of petroleum benzin and ether, and if the solvent, after separation, be transferred to a porcelain dish, allowed to evaporate spontaneously, and the residue dissolved in 3 Cc. of water, the solution should not have a sweet taste (absence of *saccharin*), nor should it give a violet color upon the addition of a diluted solution of ferric chloride (1 in 200) (absence of *salicylic acid*).

Tested by the following method, White Wine should be found to contain not less than 7 percent. nor more than 12 percent., by weight (equivalent to 8.5 percent. to 15 percent. by volume), of absolute alcohol:

Take the specific gravity (to four decimals) of a sufficient portion of the White Wine carefully measured at the temperature of 15.6° C. (60° F.), evaporate the Wine in a tared dish to one-third of its original weight, cool, and add water until the liquid measures its original volume at 15.6° C. (60° F.); then take the specific gravity (to four decimals) again. The difference between the two specific gravities deducted from 1.0000 corresponds to the specific gravity of an alcohol containing the same percentage of absolute alcohol, by weight or volume, as the Wine under examination, the corresponding percentage being ascertained by referring to the alcohol tables. (See Appendix.)

VINUM ANTIMONII

Wine of Antimony

Antimony and Potassium Tartrate, *four grammes* . . .	4 Gm.
Boiling Distilled Water, *sixty-five cubic centimeters*	65 Cc.
Alcohol, *one hundred and seventy-five cubic centimeters*	175 Cc.
White Wine, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Antimony and Potassium Tartrate in the Boiling Distilled Water. Add this solution to a mixture of the Alcohol with *seven hundred and twenty-five cubic centimeters* of White Wine; mix well, and allow the mixture to stand until it has cooled. Then filter and add sufficient White Wine through the filter to make the liquid measure *one thousand cubic centimeters.*

Average dose.—1 Cc. (15 minims).

VINUM COCÆ

Wine of Coca

Fluidextract of Coca, *sixty-five cubic centimeters*	65 Cc.
Alcohol, *seventy-five cubic centimeters*	75 Cc.
Sugar, *sixty-five grammes*	65 Gm.
Red Wine, *a sufficient quantity,*	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the sugar in *five hundred cubic centimeters* of Red Wine, add the Alcohol and Fluidextract of Coca, and enough Red Wine to make the liquid measure *one thousand cubic centimeters.* Set the mixture aside for two days; then filter through paper, in a well-covered funnel.

Average dose.—16 Cc. (4 fluidrachms).

VINUM COLCHICI SEMINIS

Wine of Colchicum Seed

Fluidextract of Colchicum Seed, *one hundred cubic centimeters*	100 Cc.
Alcohol, *one hundred and fifty cubic centimeters*	150 Cc.
White Wine, *seven hundred and fifty cubic centimeters*	750 Cc.
To make *one thousand cubic centimeters* . .	1000 Cc.

Mix them. Set the mixture aside for two days; then filter through paper, in a well-covered funnel.

Average dose.—2 Cc. (30 minims).

VINUM ERGOTÆ

Wine of Ergot

Fluidextract of Ergot, *two hundred cubic centimeters*	200 Cc.
Alcohol, *fifty cubic centimeters*	50 Cc.
White Wine, *seven hundred and fifty cubic centimeters* . . .	750 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them. Set the mixture aside for two days; then filter through paper, in a well-covered funnel.

Average dose.—8 Cc. (2 fluidrachms).

VINUM FERRI

Wine of Iron

[VINUM FERRI CITRATIS, PHARM. 1890]

Iron and Ammonium Citrate, *forty grammes* . . .	40 Gm.
Tincture of Sweet Orange Peel, *sixty cubic centimeters* . .	60 Cc.
Syrup, *one hundred cubic centimeters*	100 Cc.
White Wine, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . .	1000 Cc.

Dissolve the Iron and Ammonium Citrate in *seven hundred cubic centimeters* of White Wine. Add to this the Tincture of Sweet Orange Peel and the Syrup, and, lastly, enough White Wine to make the product measure *one thousand cubic centimeters*. Set the mixture aside for two days; then filter through paper, in a well-covered funnel.

Average dose.—8 Cc. (2 fluidrachms).

VINUM FERRI AMARUM

Bitter Wine of Iron

Soluble Iron and Quinine Citrate, *fifty grammes*	50 Gm.
Tincture of Sweet Orange Peel, *sixty cubic centimeters* . .	60 Cc.
Syrup, *three hundred cubic centimeters*	300 Cc.
White Wine, *a sufficient quantity*,	
To make *one thousand cubic centimeters* . . .	1000 Cc.

Dissolve the Soluble Iron and Quinine Citrate in *five hundred cubic centimeters* of White Wine. Add to this the Tincture of Sweet Orange Peel and the Syrup, and, lastly, enough White Wine to make the product measure *one thousand cubic centimeters*. Set the mixture aside for two days; then filter through paper, in a well-covered funnel.

Average dose.—8 Cc. (2 fluidrachms).

VINUM IPECACUANHÆ

Wine of Ipecac

Fluidextract of Ipecac, *one hundred cubic centimeters*	100 Cc.
Alcohol, *one hundred cubic centimeters*	100 Cc.
White Wine, *eight hundred cubic centimeters*	800 Cc.
To make *one thousand cubic centimeters*	1000 Cc.

Mix them. Set the mixture aside for two days; then filter through paper, in a well-covered funnel.

Average dose.—1 Cc. (15 minims).

VINUM OPII

Wine of Opium

Granulated Opium, *one hundred grammes*	100 Gm.
Saigon Cinnamon, in No. 60 powder, *ten grammes*	10 Gm.
Cloves, in No. 30 powder, *ten grammes*	10 Gm.
Alcohol,	
White Wine, each, *a sufficient quantity,*	
To make *one thousand cubic centimeters*	1000 Cc.

Mix *one hundred and fifty cubic centimeters* of Alcohol and *eight hundred and fifty cubic centimeters* of White Wine. Macerate the Opium, Saigon Cinnamon, and Cloves in a stoppered container, in a moderately warm place, with *seven hundred and fifty cubic centimeters* of this menstruum, during seven days, with occasional agitation; then filter through purified cotton, in a well-covered funnel, returning the first portions until the filtrate passes perfectly clear, and finally pass enough menstruum through the residue to make the liquid measure *one thousand cubic centimeters.*

Average dose.—0.5 Cc. (8 minims).

VINUM RUBRUM

Red Wine

An alcoholic liquid, made by fermenting the juice of fresh red-colored grapes, the fruit of *Vitis vinifera* Linné (Fam. *Vitaceæ*), in presence of their skins, and subjected to the usual cellar-treatment for fining and aging.

When Red Wine is prescribed without further specification, it is recommended that a dry Red Wine of domestic production be employed.

Red Wine should be preserved in well-closed casks filled as full as possible, or in well-stoppered bottles, in a cool place.

A deep red liquid, having a pleasant odor free from yeastiness, and a fruity, moderately astringent, pleasant and slightly acidulous taste, without excessive sweetness or acidity.

The specific gravity, at 15.6° C. (60° F.), should be not less than 0.989 nor more than 1.010.

If a portion of Red Wine be evaporated, the residue, when dried during twelve hours on a water-bath, should amount to not less than 1.6 percent. nor more than 3.5 percent.; this residue, ignited at a low temperature until burned gradually to whiteness, moistened with a small portion of ammonium carbonate T.S., and again carefully ignited, should weigh not less than 0.16 Gm. nor more than 0.25 Gm. for each 100 Cc. of Red Wine used.

To neutralize 10 Cc. of Red Wine should require not less than 3 Cc. nor more than 5.5 Cc. of normal potassium hydroxide V.S. (limit of free acid), litmus T.S. being used as indicator. If 10 Cc. of Red Wine be diluted with an equal volume of water and treated with 3 drops of ferric chloride T.S., the liquid should acquire a brownish-green color (presence of tannic acid).

With lead acetate T.S. Red Wine forms a heavy precipitate which may vary in color from bluish-green to green.

If 50 Cc. of Red Wine be treated with a slight excess of ammonia water, the liquid should acquire a green or brownish-green color; if it be then well shaken with 25 Cc. of ether, the greater portion of the ethereal layer removed, and evaporated in a porcelain dish with an excess of acetic acid and a few fibres of unmordanted silk, the latter should not acquire a crimson or violet color (absence of coal-tar aniline colors).

If 25 Cc. of Red Wine, heated to about 45° C. (113° F.), be well agitated with 25 Gm. of manganese dioxide, the liquid filtered off and acidulated with hydrochloric acid, it should not acquire a red color (absence of acid fuchsine).

If 75 Cc. of Red Wine be acidified with 5 Cc. of diluted sulphuric acid (1 in 5) and thoroughly shaken in a separator with a mixture of equal parts of petroleum benzin and ether, and if the solvent after separation be transferred to a porcelain dish, allowed to evaporate spontaneously, and the residue dissolved in 5 Cc. of water, the solution should not have a sweet taste (absence of saccharin), nor should it give a violet color upon the addition of a diluted solution (1 in 200) of ferric chloride (absence of salicylic acid).

Tested by the following method, Red Wine should be found to contain not less than 7 percent. nor more than 12 percent., by weight (equivalent to 8.5 percent. to 15 percent. by volume), of absolute alcohol:

Take the specific gravity (to four decimals) of a sufficient portion of the Red Wine accurately measured at the temperature of 15.6° C. (60° F.), evaporate the Wine in a tared dish to one-third of its original weight, cool, and add water until the liquid measures its original volume at 15.6° C. (60° F.); then take the specific gravity (to four decimals) again. The difference between the two specific gravities deducted from 1.0000 corresponds to the specific gravity of an alcohol containing the same percentage of absolute alcohol, by weight or volume, as the Wine under examination, the corresponding percentage being ascertained by referring to the alcohol tables. (See Appendix.)

XANTHOXYLUM

Xanthoxylum

The dried bark of *Xanthoxylum americanum* Miller (Northern Prickly Ash), or of *Fagara Clava-Herculis* (Linné) Small (Southern Prickly Ash) (*Fam. Rutaceæ*).

Northern Prickly Ash.—In curved or quilled fragments, about 1 Mm. outer surface brownish-gray, with whitish patches, and minute, black ntly furrowed, with some brown, glossy, straight, two-edged spines, linear at the base, and about 5 Mm. long; inner surface whitish, smooth; fracture short, non-fibrous, green in the outer and yellowish in the inner layer; inodorous; taste bitterish, very pungent.

Southern Prickly Ash.—In very large quills or sheets, 1 to 2 Mm. thick, externally of a light purplish-gray with large silvery-gray patches, and marked by many large corky projections, frequently 2 Cm. high, which often bear stout brown spines; otherwise like the Northern Prickly Ash.

Xanthoxylum should not be confounded with the bark of *Aralia spinosa* Linné (Fam. *Araliaceæ*), which is nearly smooth externally, and beset with slender prickles in transverse rows.

Average dose.— 2 Gm. (30 grains).

ZEA

Zea

The fresh styles and stigmas of *Zea Mays* Linné (Fam. *Gramineæ*).

A matted mass of slender filaments, 5 to 15 Cm. long, thread-like, yellowish or brownish; nearly inodorous; taste faintly sweetish with a characteristic flavor.

ZINCI ACETAS

Zinc Acetate

$$Zn(C_2H_3O_2)_2 + 2H_2O = 217.82$$

It should contain in the uneffloresced condition not less than 99.5 percent. of pure Zinc Acetate [$(CH_3.COO)_2Zn + 2H_2O$], and should be kept in well-stoppered bottles.

Soft, white, six-sided, monoclinic plates, of a pearly lustre, having a faintly acetous odor, and in dilute solutions an astringent, metallic taste. Exposed to the air, the salt gradually effloresces and loses some of its acid.

Soluble in about 2.5 parts of water, and in 36 parts of alcohol at 25° C. (77° F.); soluble in 1.5 parts of boiling water, and in 0.6 part of boiling alcohol. On protracted boiling with water acetic acid is lost, and an insoluble basic salt formed.

When heated, the salt is partially fused, losing water and acid. At a higher temperature it is decomposed, evolving acetone and other combustible vapors, and leaving a residue of zinc oxide.

Its aqueous solution reddens blue litmus paper.

The aqueous solution of the salt (1 in 20) yields, with potassium ferrocyanide T.S., a white gelatinous precipitate, and with ammonium sulphide T.S. a pure white precipitate.

Ten Cc. of the aqueous solution of the salt (1 in 20), to which 1 Cc. of hydrochloric acid has been added, should not respond to the Time-Limit Test for *arsenic*, *cadmium*, *lead*, and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

The addition of a few drops of ferric chloride T.S. to an aqueous solution of the salt (1 in 20) produces a red color.

Ammonium carbonate T.S., or potassium hydroxide T.S., when added in small portions to the aqueous solution of the salt (1 in 20), produces at first a precipitate of a pure white color, which dissolves completely upon the addition of an excess of the reagent.

The aqueous solution of the salt (1 in 20), after the addition of a few drops of diluted nitric acid, should remain clear upon the addition of either barium chloride T.S. (absence of *sulphate*) or silver nitrate T.S. (absence of *chloride*).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.— 0.125 Gm. = 125 milligrammes (2 grains).

ZINCI BROMIDUM

Zinc Bromide

$ZnBr_2 = 223.62$

It should contain, when anhydrous, at least 97 percent. of pure Zinc Bromide, and should be kept in small, glass-stoppered bottles.

A white, or nearly white, granular powder; odorless, having, even in dilute solutions, a sharp, saline and metallic taste. Very deliquescent.

Readily soluble in water and alcohol.

When heated to 394° C. (741.2° F.), the salt fuses, and, with a careful increase of heat, may be sublimed in the form of needle-shaped prisms.

Its aqueous solution gives a slightly acid reaction with blue litmus paper.

The aqueous solution of the salt (1 in 20) yields a pure white precipitate with hydrogen sulphide T.S. and ammonium sulphide T.S., and also with potassium ferrocyanide T.S.

Silver nitrate T.S. produces a yellowish-white precipitate insoluble in nitric acid and in a moderate excess of ammonia water.

If to 10 Cc. of the aqueous solution of the salt (1 in 20) 1 Cc. of chloroform be added, then chlorine water (which has been diluted with an equal volume of water), cautiously introduced, drop by drop, with constant agitation, the liberated bromine will dissolve in the chloroform, imparting to it a yellow to orange color, free from any violet tint (absence of *iodide*).

On adding ammonium carbonate T.S. to the aqueous solution of Zinc Bromide, a white precipitate is produced, which should completely redissolve in an excess of the reagent.

The aqueous solution of the salt (1 in 20), to which sufficient hydrochloric acid has been added to insure a clear solution, should not respond to the Time-Limit Test for *arsenic*, *cadmium*, *lead*, and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

Another portion of this aqueous solution should not be rendered turbid by the addition of barium chloride T.S. (absence of *sulphate*).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 1 Gm. of Zinc Bromide be dissolved in 50 Cc. of acetic acid, 2 Gm. of lead dioxide (free from chloride) be added, and the mixture evaporated in a small beaker to at least 10 Cc., then the residue, diluted with 10 Cc. of distilled water and filtered, should give not more than a slight turbidity on the addition of 2 Cc. of nitric acid and a few drops of silver nitrate T.S. (limit of *chloride*).

If 0.3 Gm. of the anhydrous salt be dissolved in 10 Cc. of water, and 2 drops of potassium chromate T.S. be added, it should require not less than 26 Cc. nor more than 26.8 Cc. of tenth-normal silver nitrate V.S. to produce a permanent red color, corresponding to not less than 97 percent. of the pure salt.

Average dose.— 0.125 Gm. = 125 milligrammes (2 grains).

ZINCI CARBONAS PRÆCIPITATUS

Precipitated Zinc Carbonate

Hydrated Zinc Carbonate, which, upon ignition, should yield not less than 72 percent. of zinc oxide [$ZnO = 80.78$].

An impalpable, white powder, of somewhat variable chemical composition, without odor or taste. Permanent in the air.

Insoluble in water or alcohol; completely soluble in diluted acids with copious effervescence; also soluble in ammonia water, and in ammonium carbonate T.S.

When strongly heated, the salt loses water and carbon dioxide, and leaves a residue, which is yellow while hot, but becomes white on cooling.

When a small portion of the salt is moistened with a drop of cobaltous nitrate T.S., and heated before the blow-pipe, it will assume a vivid green color.

For making tests of identity and purity, make a solution by adding 10 Cc. of diluted sulphuric acid and 10 Cc. of water to 1.25 Gm. of the salt, and, after effervescence has ceased, remove the undissolved excess by filtration.

In a portion of this solution a white gelatinous precipitate is produced by potassium ferrocyanide T.S., and a pure white precipitate by ammonium sulphide T.S.

Another portion of the solution, acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *arsenic*, *cadmium*, *lead*, and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

Another portion of the solution should yield, with ammonium carbonate T.S., a white precipitate, which should redissolve completely in an excess of the reagent.

If 1 Gm. of the salt be placed in a flask with 10 Cc. of boiling water, and 2 drops of phenolphthalein T.S. added, not more than 1 Cc. of tenth-normal hydrochloric acid V.S. should be required to discharge the red color (limit of *alkali*).

One Gm. of Zinc Carbonate, after strong ignition in a porcelain crucible, should leave a residue of zinc oxide weighing not less than 0.720 Gm.

ZINCI CHLORIDUM

Zinc Chloride

$ZnCl_2 = 135.26$

It should contain, when anhydrous, not less than 99.5 percent. of pure Zinc Chloride, and should be kept in small, glass-stoppered bottles.

A white, or nearly white, granular powder, or porcelain-like masses, irregular, or moulded into pencils; odorless, *of such intensely caustic properties as to make tasting dangerous*, unless the salt be dissolved in much water; the dilute solution has an astringent, metallic taste. Very deliquescent.

Soluble in about 0.4 part of water at 25° C. (77° F.), forming a clear solution, which, on protracted boiling, deposits a basic salt; very soluble in alcohol.

When heated to 115° C. (239° F.), Zinc Chloride fuses to a clear liquid. At a higher temperature it is partly volatilized in dense, white fumes, and partly decomposed, leaving a residue of zinc oxide.

Its aqueous solution reddens blue litmus paper.

The aqueous solution of the salt (1 in 20) yields, with potassium ferrocyanide T.S., a white gelatinous precipitate, and with ammonium sulphide T.S. a pure white precipitate.

Silver nitrate T.S. produces a white precipitate insoluble in nitric acid.

The aqueous solution (1 in 20) should be clear, or at most only very slightly opalescent; and if it be mixed with an equal volume of alcohol, a single drop of hydrochloric acid should suffice to render 10 Cc. of the mixture perfectly clear (limit of *oxychloride*).

The aqueous solution of the salt (1 in 20), to which 1 Cc. of diluted hydrochloric acid has been added, should not respond to the Time-Limit Test for *arsenic*, *cadmium*, *lead*, and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

If ammonium carbonate T.S. be added, in small portions, to the aqueous solution (1 in 20), the precipitate produced should be of a pure white color, and should redissolve completely in an excess of the reagent.

The aqueous solution of the salt (1 in 20), after the addition of 1 Cc. of diluted hydrochloric acid, should not be rendered turbid by the addition of barium chloride T.S. (absence of *sulphate*).

Dissolve 0.5 Gm. of Zinc Chloride in 200 Cc. of boiling distilled water, add about 5 drops of phenolphthalein T.S., and then sufficient sodium carbonate T.S., with constant stirring, to cause the solution to assume a permanent red color; transfer the resulting precipitate to a plain filter, wash it with boiling distilled water until all soluble matter has been removed, then dissolve it in a sufficient quantity of nitric acid, evaporate the solution to dryness, and ignite the salt until it ceases to lose weight; the residue should weigh not less than 0.297 Gm.

ZINCI IODIDUM

Zinc Iodide

$ZnI_2 = 316.70$

It should contain, when anhydrous, not less than 98 percent. of pure Zinc Iodide, and should be kept in small, glass-stoppered bottles protected from light.

A white, or nearly white, granular powder; odorless, and having a sharp, saline and metallic taste. Very deliquescent, and, upon exposure to air and light, becoming brown from liberated iodine.

Readily soluble in water, alcohol, or ether.

When heated to about 446° C. (834.8° F.), the salt fuses to a colorless liquid, and at a higher temperature sublimes, forming quadratic needles, while a small part is decomposed and leaves a residue of zinc oxide.

Its aqueous solution reddens blue litmus paper.

An aqueous solution of the salt (1 in 20) yields a white gelatinous precipitate with potassium ferrocyanide T.S., and a pure white precipitate with ammonium sulphide T.S.

With silver nitrate T.S. it yields a pale yellow precipitate, insoluble in ammonia water; with mercuric chloride T.S., a red precipitate, soluble in potassium iodide T.S.

The aqueous solution of the salt (1 in 20), to which sufficient diluted hydrochloric acid has been added to insure a clear solution, should not respond to the Time-Limit Test for *arsenic*, *cadmium*, *lead*, and *copper* (see Appendix, Test No. 121): in applying this test the addition of ammonia water should be omitted.

Another portion of the aqueous solution should not be rendered turbid upon the addition of barium chloride T.S. (absence of *sulphate*).

If ammonium carbonate T.S. be added to the aqueous solution of the salt (1 in 20), a pure white precipitate will form, which should redissolve completely in an excess of the reagent.

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

If 1 Gm. of Zinc Iodide be mixed with 5 Cc. of distilled water, and sufficient ammonia water be added to redissolve the precipitate formed, followed by a solution of 1.5 Gm. of silver nitrate in 10 Cc. of water, then, after shaking and filtering, the filtrate should not be rendered more than slightly turbid by the addition of an excess of nitric acid (limit of *chloride*).

If 0.5 Gm. of dry Zinc Iodide be dissolved in 20 Cc. of water, and if 35 Cc. of tenth-normal silver nitrate V.S., 5 Cc. of nitric acid, and 3 Cc. of ferric ammonium sulphate T.S. be added, and the mixture well shaken, then the addition of not less than 3.4 Cc. nor more than 4 Cc. of tenth-normal potassium sulphocyanate V.S. should be required to give a permanent reddish-brown tint to the solution.

Average dose.—0.065 Gm. = 65 milligrammes (1 grain).

ZINCI OXIDUM

Zinc Oxide

$ZnO = 80.78$

It should contain not less than 99 percent. of pure Zinc Oxide.

A very fine, amorphous, white or yellowish-white powder, free from gritty particles, without odor or taste; it gradually absorbs carbon dioxide from the air.

Insoluble in water or alcohol. Completely soluble without effervescence, in diluted acids; also in ammonia water, and in ammonium carbonate T.S.

When heated, it assumes a yellow color, which disappears on cooling.

If a small portion of Zinc Oxide be moistened with a drop of cobaltous nitrate T.S., and heated before the blow-pipe, it will assume a vivid green color.

For making tests of identity and purity, digest 1 Gm. of Zinc Oxide, with occasional agitation, in a mixture of 10 Cc. of diluted hydrochloric acid and 10 Cc. of water until saturated; then remove the undissolved Zinc Oxide by filtration.

In a portion of the filtrate a white gelatinous precipitate is produced by potassium ferrocyanide T.S., and a pure white precipitate by ammonium sulphide T.S.

Another portion of the filtrate, acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *arsenic*, *cadmium*, *lead*, and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

Another portion of the filtrate should yield, upon the gradual addition of ammonium carbonate T.S., a pure white precipitate, which should almost completely redissolve in an excess of the reagent.

If 1 Gm. of Zinc Oxide be placed in a flask with 10 Cc. of boiling water, and 2 drops of phenolphthalein T.S. be added, not more than 1 Cc. of tenth-normal hydrochloric acid V.S. should be required to discharge the red color (limit of *alkali*).

If 1 Gm. of Zinc Oxide be dissolved in a sufficient quantity of diluted nitric acid, the solution should remain clear upon the addition of silver nitrate T.S. (absence of *chloride*), and not become more than slightly turbid upon the addition of barium chloride T.S. (limit of *sulphate*).

If 1 Gm. of freshly ignited Zinc Oxide be digested with 30 Cc. of normal hydrochloric acid V.S. until solution is complete, and 2 drops of methyl-orange T.S. be added, not more than 5.5 Cc. of normal potassium hydroxide V.S. should be required for neutralization (each Cc. of normal hydrochloric acid consumed corresponding to 4.04 percent. of zinc oxide). The normal potassium hydroxide V.S. should be added slowly with constant stirring, waiting until the precipitated zinc hydroxide has redissolved before adding further portions of the reagent.

Average dose.—0.250 Gm. = 250 milligrammes (4 grains).

ZINCI PHENOLSULPHONAS

Zinc Phenolsulphonate

$Zn(C_6H_5O_4S)_2 + 8H_2O = 551.56$

It should contain, in uneffloresced crystals, not less than 99.5 percent. of pure Zinc Paraphenolsulphonate [$(C_6H_4(OH)SO_3)_2Zn$ 1:4 + $8H_2O$], and should be kept in small, well-stoppered bottles.

Colorless, transparent, rhombic prisms or tabular crystals; odorless, and having an astringent, metallic taste. Exposed to the air the salt effloresces, and upon exposure to light and air may become slightly pink.

Soluble in 1.7 parts of water or alcohol at 25° C. (77° F.), and in 0.3 part of boiling water, and 0.56 part of boiling alcohol.

When heated to 100° C. (212° F.), the salt loses 6 molecules of water of crystallization, and it loses the remainder at 125° C. (257° F.). At a higher temperature it chars, emitting inflammable vapors having the odor of phenol, and finally leaves a residue amounting to about 14.6 percent. of the original weight.

Its aqueous solution reddens blue litmus paper.

A dilute solution of the salt (1 in 100) is colored pale violet by ferric chloride T.S.

The aqueous solution of the salt (1 in 20) yields, with potassium ferrocyanide T.S., a white gelatinous precipitate, and, with ammonium sulphide T.S., a pure white precipitate.

Ammonium carbonate T.S., or potassium hydroxide T.S., when added in small portions to the aqueous solution of the salt (1 in 20), produces a precipitate of a pure white color, which dissolves completely upon the addition of an excess of the reagent.

The aqueous solution of the salt (1 in 20), to which 1 Cc. of diluted hydrochloric acid has been added, should not respond to the Time-Limit Test for *arsenic, cadmium, lead,* and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

The aqueous solution of the salt (1 in 20) should not become turbid upon the addition of barium chloride T.S. (absence of *sulphate*), nor silver nitrate T.S. (absence of *chloride*).

Five Cc. of the aqueous solution of the salt (1 in 10) should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.—**0.125 Gm. = 125 milligrammes (2 grains).**

ZINCI STEARAS

Zinc Stearate

A very fine, white powder, tasteless, and having a very faint odor, resembling that of fat. Zinc Stearate contains a small but varying proportion of zinc palmitate.

Insoluble in water, alcohol, or ether.

When heated, the salt fuses. At a higher temperature it is decomposed, giving off inflammable vapors and the odor of burning fat, and finally leaves about 13.5 percent. of residue, which consists chiefly of zinc oxide.

The salt should have a neutral reaction to moistened litmus paper.

If 0.5 Gm. of Zinc Stearate be heated with a mixture of 9.5 Cc. of distilled water and 0.5 Cc. of hydrochloric acid, stearic acid will be liberated and float as an oily layer on the surface of the liquid.

If, after filtering this liquid through a small wetted filter, all of the zinc be precipitated by ammonium sulphide T.S., the filtrate should leave no fixed residue on evaporation (absence of *alkalies, alkali earths*, etc.).

If 0.5 Gm. of Zinc Stearate be heated with a mixture of 9.5 Cc. of distilled water and 0.5 Cc. of nitric acid, and filtered, the filtrate should not become more than slightly turbid upon the addition of silver nitrate T.S. (absence of more than traces of *chlorides*).

If 1 Gm. of Zinc Stearate be boiled with 50 Cc. of distilled water containing 2 Cc. of nitric acid, and filtered through a wetted filter, after thoroughly washing the precipitate with boiling water, the filtrate and washings, when evaporated to dryness and ignited, should leave a residue weighing not less than 0.14 Gm. and not more than 0.16 Gm.

ZINCI SULPHAS

Zinc Sulphate

$ZnSO_4 + 7H_2O = 285.41$

It should contain, in uneffloresced crystals, not less than 99.5 percent. of pure Zinc Sulphate $[SO_2.O_2Zn + 7H_2O]$, and should be kept in well-stoppered bottles.

Colorless, transparent, rhombic crystals, or a granular crystalline powder, without odor, and having an astringent, metallic taste. Efflorescent in dry air.

Completely soluble in 0.53 part of water at 25° C. (77° F.), and in 0.2 part of boiling water; soluble in about 3 parts of glycerin; insoluble in alcohol.

When rapidly heated, the salt melts. At a higher temperature it is partly decomposed, losing both water and sulphuric acid. When very gradually heated to 50° C. (122° F.), it loses 5 molecules of its water of crystallization (31.2 percent.) without melting. At 100° C. (212° F.) a sixth molecule is lost, while the last is removed, with decomposition of the salt, at a temperature of about 240° C. (464° F.).

Its aqueous solution shows an acid reaction with blue litmus paper.

The aqueous solution of the salt (1 in 20) yields a white gelatinous precipitate with potassium ferrocyanide T.S., and a white precipitate with ammonium sulphide T.S., and with barium chloride T.S.

If a small portion of the salt be moistened with a drop of cobaltous nitrate T.S., and heated before the blow-pipe, it will assume a vivid green color.

The aqueous solution of Zinc Sulphate (1 in 20), after being acidulated with hydrochloric acid, should not respond to the Time-Limit Test for *arsenic, cadmium, lead*, and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

The aqueous solution should yield, with ammonium carbonate T.S., a white precipitate, which should redissolve completely in an excess of the reagent.

The aqueous solution (1 in 20) should not be rendered more than slightly turbid by silver nitrate T.S. (limit of *chloride*).

If 1 Gm. of Zinc Sulphate, in small fragments, be agitated for some time with 10 Cc. of alcohol, the filtrate should not redden moistened blue litmus paper (absence of *free acid*).

Average dose.—Emetic, 1 Gm. (15 grains).

ZINCI VALERAS

Zinc Valerate

$Zn(C_5H_9O_2)_2 + 2H_2O = 301.28$

[Zinci Valerianas, Pharm. 1890]

It should contain not less than 99 percent. of pure Zinc Valerate [$(C_4H_9.COO)_2Zn + 2H_2O$], and should be kept in small, well-stoppered bottles.

White, pearly scales, having the odor of valeric acid, and a sweetish, astringent, and metallic taste. On exposure to the air, it slowly loses valeric acid.

Soluble in about 50 parts of water, and in about 35 parts of alcohol at 25° C. (77° F.); somewhat more soluble in absolute alcohol. Boiling renders the aqueous solution turbid from loss of acid and formation of a basic salt.

When heated, the salt melts. At a higher temperature it is decomposed, giving off inflammable vapors, and finally leaving a residue of zinc oxide.

Its aqueous solution reddens blue litmus paper.

If 0.5 Gm. of Zinc Valerate be dissolved in a mixture of 0.5 Cc. of hydrochloric acid and 9 Cc. of water, the valeric (isovaleric) acid will be liberated and float as an oily layer on the surface of the liquid.

After filtering through a small wetted filter, the clear solution should not respond to the Time-Limit Test for *arsenic*, *cadmium*, *lead*, and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

If 0.5 Gm. of Zinc Valerate be dissolved in a mixture of 0.5 Cc. of nitric acid and 4.5 Cc. of distilled water, and the mixture filtered through a small wetted filter, the filtrate should show but a faint cloudiness upon the addition of either barium chloride T.S. (absence of *sulphate*) or silver nitrate T.S. (absence of *chloride*).

Zinc Valerate should dissolve without residue in ammonium carbonate T.S.

If 0.5 Gm. of Zinc Valerate be triturated with 3 Cc. of water, and 0.2 Cc. of ferric chloride T.S. added, the filtrate should not show a red color (absence of *acetate*).

If a concentrated solution of copper acetate in water be added to a concentrated aqueous solution of Zinc Valerate, the mixture should remain perfectly clear (absence of *butyrate*).

If 0.5 Gm. of Zinc Valerate be heated with a mixture of 9.5 Cc. of distilled water and 0.5 Cc. of hydrochloric acid and filtered, the filtrate should not respond to the Modified Gutzeit's Test for *arsenic* (see Appendix, Test No. 17).

Average dose.—0.125 Gm. = 125 milligrammes (2 grains).

ZINCUM

Zinc

$Zn = 64.9$

It should contain not less than 99 percent. of pure metallic Zinc.

A bluish-white metal, showing a crystalline fracture; in the form of thin sheets, or in irregular, granulated pieces, or moulded into thin pencils, or in fine powder, and having a specific gravity ranging from 6.9 when it is cast to 7.2 after it is rolled.

Soluble in diluted sulphuric or hydrochloric acid with evolution of hydrogen.

When heated above 100° C. (212° F.) and not above 150° C. (302° F.), the metal becomes malleable and ductile; above 200° C. (392° F.) it becomes sufficiently brittle to be powdered in an iron mortar; at 412° to 415° C. (773.6° to 779° F.) it melts, and at 940° C. (1724° F.) it boils and may be readily distilled.

If 1 Gm. of Zinc be added to 20 Cc. of diluted hydrochloric acid, the liberated hydrogen should not have a disagreeable odor, nor should it color a strip of paper moistened with lead acetate T.S. (absence of *sulphur*), or with silver nitrate T.S. (absence of *arsenic*, *antimony*, and *phosphorus*). The resulting solution should be clear and colorless, and should yield a white gelatinous precipitate with potassium ferrocyanide T.S., and a white precipitate with ammonium sulphide T.S.

If 1 Gm. of Zinc be dissolved in a mixture of 10 Cc. each of nitrohydrochloric acid and water, the solution evaporated to dryness, the residue moistened with 2 Cc. of hydrochloric acid and again evaporated, and the final residue dissolved in 10 Cc. of water, this solution should not respond to the Time-Limit Test for *arsenic*, *cadmium*, *lead*, and *copper* (see Appendix, Test No. 121); in applying this test the addition of ammonia water should be omitted.

ZINGIBER

Ginger

The dried rhizome of *Zingiber officinale* Roscoe (Fam. *Zingiberaceæ*).

Laterally compressed, irregularly branched pieces; externally whitish or pale buff, longitudinally striate; fracture short-fibrous, mealy, showing numerous small oil and resin cells and circular groups of fibrovascular bundles; odor agreeably aromatic; taste aromatic and pungent.

Average dose.—1 Gm. (15 grains).

APPENDIX

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I. Tests, Reagents, Test Solutions, and Volumetric Solutions

Introductory

Official Substances as Reagents.—Some official substances (chemicals, chemical solutions, etc.) are sufficiently pure to be used as reagents, if they comply with the tests of purity prescribed by the Pharmacopœia. Latin official names are not used as titles in the following list, the English name being preferred. In the case of non-official substances, the presence of certain impurities, though immaterial for their use as medicines, renders their employment as reagents unsuitable. Whenever a greater degree of purity is required than is provided for by the text of the Pharmacopœia, it will be specially mentioned in the following lists.

Abbreviations and Signs Used:

T.S. = Test Solution.
V.S. = Volumetric Solution.
$\frac{N}{1}$ = Normal (see under "Volumetric Solutions," page 544).
$\frac{N}{2}$ = Half-normal; $\frac{N}{10}$ = Tenth-normal; $\frac{N}{50}$ = Fiftieth-normal; $\frac{N}{100}$ = Hundredth-normal.
$\frac{2N}{1}$ = Double-normal (sometimes written: 2N).

Keeping of Reagents.—Reagents should be kept in bottles made of glass free from lead and arsenic, and not subject to corrosion by acids and alkalies.

The bottles should be closed by well-ground glass or rubber stoppers. Ground glass stoppers of bottles containing alkali hydroxides, ammonium sulphide, ammonia water, and other substances of alkaline reaction rapidly attacking ground glass surfaces, should be coated with a thin film of petrolatum.

Reagents easily affected by light, such as hydrogen sulphide T.S., ammonium sulphide T.S., chlorine water, silver nitrate T.S., etc., should be kept in bottles made of dark amber-colored glass.

NOTE.—As some of the following test solutions are in certain cases directed to be used in definite quantities in place of the regular volumetric solutions, it is important that they should always be prepared of the *exact strength prescribed.*

Tests, Reagents, and Test Solutions

NOTE.—The reagents are arranged in alphabetical order. The test solutions are usually mentioned in connection with the principal chemical or other substance from which they are prepared. The volumetric solutions will be found on page 544.

Whenever *water* is required or mentioned as a solvent in the tests given in the Pharmacopœia, or in the preparation of any reagent, it is understood that *distilled water* shall be used.

1. **Absolute Alcohol.**—Ethyl alcohol, C_2H_5OH.—Use the official absolute alcohol [*Alcohol Absolutum*, U. S. P.], which should be neutral to litmus T.S.

2. **Acetic Acid**, $HC_2H_3O_2$.—Use the official acetic acid [*Acidum Aceticum*, U. S. P.].

3. **Albumin Test Solution.**—Carefully separate the white of a hen's egg (which should be fresh) from the yolk, shake it thoroughly with 100 Cc. of water, and filter. This solution should be freshly made when required.

4. **Alcohol.**—Ethyl Alcohol, C_2H_5OH.—Use the official alcohol [*Alcohol*, U. S. P.]. Alcohol of lower strength is prepared as follows :

Alcohol, 90 percent.—Mix 51 Cc. of alcohol [*Alcohol*, U. S. P.] with 3 Cc. of distilled water. The specific gravity of the mixture should be 0.826 at 25° C. (77° F.), corresponding to 90 percent., by volume, of absolute alcohol.

5. **Alcohol, 80 percent.**—Mix 45.5 Cc. of alcohol [*Alcohol*, U. S. P.] with 9.5 Cc. of distilled water. The specific gravity of the mixture should be 0.856 at 25° C. (77° F.), corresponding to 80 percent., by volume, of absolute alcohol.

6. **Alcohol, 70 percent.**—Mix 38.6 Cc. of alcohol [*Alcohol*, U. S. P.] with 15 Cc. of distilled water. The specific gravity of the mixture should be 0.882 at 25° C. (77° F.), corresponding to 70 percent., by volume, of absolute alcohol.

7. **Ammonia Water**, NH_4OH.—Use the official ammonia water [*Aqua Ammoniæ*, U. S. P.].

8. Ammonium Carbonate Test Solution.—Dissolve 20 Gm. of ammonium carbonate, $NH_4HCO_3 . NH_4NH_2CO_2$ [*Ammonii Carbonas*, U. S. P.], in a mixture of 20 Cc. of ammonia water and 70 Cc. of water, and add sufficient water to measure 100 Cc.

9. Ammonium Chloride Test Solution.—Dissolve 10 Gm. of ammonium chloride, NH_4Cl [*Ammonii Chloridum*, U. S. P.], in sufficient water to measure 100 Cc.

10. Ammonium Molybdate Test Solution.—Dissolve 15 Gm. of finely powdered ammonium molybdate, $(NH_4)_6Mo_7O_{24} + 4H_2O$, in 100 Cc. of distilled water, adding sufficient ammonia water, if necessary, to effect solution. Then gradually pour the liquid into 100 Cc. of nitric acid (sp. gr. 1.403 at 25° C. [77° F.]). The resulting solution, after being subjected to gentle heat for about two hours, should be decanted from any yellow sediment which may be deposited.

Alternative Method

Solution No. 1.	
Molybdic Acid, H_2MoO_4	10 Gm.
Ammonia Water (10 percent.)	42 Cc.
Solution No. 2.	
Nitric acid (sp. gr. 1.403), Water, of each	63 Cc.

Pour Solution No. 1 into Solution No. 2 gradually, shaking repeatedly. After being subjected to a gentle heat for about two hours, the solution should be decanted from any yellow sediment which may be deposited.

Preserve the test solution in the dark, and, if a sediment should form in it after some days, carefully decant the clear solution from it.

11. Ammonium Oxalate Test Solution.—Dissolve 4 Gm. of pure crystallized ammonium oxalate, $(NH_4)_2C_2O_4 + H_2O$, in sufficient water to measure 100 Cc. Or, dissolve 4 Gm. of pure oxalic acid (see No. 73) in 100 Cc. of water, add 15 Cc. of ammonia water, boil to expel excess of ammonia, and dilute with water to 113 Cc.

On evaporating a portion of the test solution, and igniting the residue, it should be completely volatilized (absence of *fixed impurities*). The precipitate produced by the addition of silver nitrate T.S., or by barium chloride T.S., should dissolve without residue upon the addition of nitric acid (absence of *chlorides* and *sulphates*).

12. Ammonium Sulphate, $(NH_4)_2SO_4$.—This salt should respond to the following tests of purity: Three grammes should leave no appreciable residue upon ignition (absence of *fixed impurities*). The aqueous solution of the salt (1 in 10) should not respond to the Time-Limit Test for Heavy Metals (see No. 121). Another portion of this solution should not become turbid upon the addition of nitric acid and silver nitrate T.S. (absence of *chlorides*). Another portion of this solution should not be colored red upon the addition of 2 drops of hydrochloric acid and 1 drop of ferric chloride T.S. (absence of *sulphocyanate*). This salt may be prepared by neutralizing pure sulphuric acid, which has been diluted with an equal volume of water, with ammonia water, evaporating and crystallizing. During the evaporation, the solution should be tested from time to time with litmus paper, adding more ammonia if necessary to keep the liquid alkaline.

13. Ammonium Sulphide Test Solution.—Saturate 3 parts of pure ammonia water with hydrogen sulphide, prepared as directed (No. 47), and add to the solution (which now contains ammonium hydrogen sulphide, NH_4HS) 2 parts of ammonia water, which converts the greater portion of the ammonium hydrogen sulphide into ammonium sulphide, $(NH_4)_2S$. The solution should be perfectly clear and colorless, and should leave no residue on evaporation. It should not be rendered turbid either by magnesium sulphate T.S. (absence of *free ammonia*), or by calcium chloride T.S. (absence of *ammonium carbonate*). It should be protected against air and light by being kept in small, dark amber-colored bottles, in a cool, dark place. As soon as a notable deposit of sulphur has made its appearance in the solution, it should be rejected.

Ammonium polysulphide test solution is occasionally required. It is a yellow liquid, made by dissolving a small quantity of pure sulphur in the preceding colorless ammonium sulphide test solution.

14. Amyl Alcohol, $C_5H_{11}OH$.—A colorless, oily liquid having a penetrating characteristic odor, boiling at 131° C. (267.8° F.); soluble in 40 parts of water at 25° C. (77° F.); miscible with alcohol, ether, chloroform, carbon disulphide, petroleum benzin, benzene, and fixed and volatile oils.

15. Aniline (Phenylamine), $C_6H_5NH_2$.—When freshly distilled, aniline is a colorless, strongly refractive, oily liquid having a peculiar aromatic odor and a pungent, burning taste. Upon exposure to the light and air, it rapidly assumes a reddish-brown color. Specific gravity 1.0214 at 25° C. (77° F.). Aniline should distil over completely between 183° and 184° C. (361.4° and 363.2° F.). It is soluble in alcohol, ether, and the fixed and volatile oils. With acids, it forms soluble crystalline salts. When added to a solution of calcium or sodium hypochlorite a blue or purple color is produced.

16. Arsenic Test, Bettendorf's.—To a solution of the prescribed quantity of the substance to be tested in 5 Cc. of pure concentrated hydrochloric acid contained in a clean test-tube, 5 Cc. of a saturated solution of freshly prepared stannous chloride in pure concentrated hydrochloric acid (see No. 46) are added, and, after being heated for fifteen minutes while immersed in a bath of boiling water, the tube is allowed to stand for one hour. If arsenic be present in non-permissible amount, a brownish tint will become manifest when the tube is placed over a white surface and the solution viewed from above, comparison being made with a mixture of 5 Cc. each of pure concentrated hydrochloric acid and a saturated solution of stannous chloride, prepared under like conditions.

NOTE.—It is absolutely necessary that the solution of stannous chloride be freshly prepared, and that sulphates, sulphites, sulphides, and salts of mercury, gold, and selenium be absent from the reagents and the chemicals being tested.

17. Arsenic Test, Modified Gutzeit's.—The efficiency of this test depends upon a strict adherence to the conditions described below.

REAGENTS

Zinc.—This should be in a granulated or fine mossy condition and free from arsenic, sulphur, and phosphorus, and should not contain more than 0.05 percent. of iron. It should otherwise respond to all the tests given under Zinc [*Zincum*, U. S. P.].

Hydrochloric Acid (8 percent.).—Mix 22.5 Cc. of hydrochloric acid [*Acidum Hydrochloricum*, U. S. P.] with water sufficient to measure 100 Cc.

Mercuric Chloride Test-Paper.—By means of a glass rod, transfer a drop of a saturated alcoholic solution of mercuric chloride to the centre of a piece of white filter-paper (preferably the kind used for quantitative analysis) of about 4 Cm. diameter; after drying, this paper is to be twice successively moistened with the reagent and dried. It is not necessary to moisten the paper with alcohol or the reagent while using it.

Lead Acetate Test-Gauze.—A piece of cheese cloth, about 1 decimeter square, when required for use, is thoroughly impregnated with lead acetate T.S., and the excess of fluid removed by pressure.

TEST-FLASK

Select a flask of the capacity of about 60 to 75 Cc., with a neck of about 5 to 6 Cm. in length, and about 1 Cm. in diameter.

PREPARATION OF THE CHEMICAL TO BE TESTED

To 5 Cc. of the aqueous solution of the chemical (1 in 10) or to a solution in 5 Cc. of water of the residue remaining after undergoing special treatment, 1 Cc. of a mixture of equal volumes of sulphuric acid and water is added, followed by 10 Cc. of a freshly prepared saturated solution of sulphurous acid. This liquid, contained in a small beaker, is heated upon a bath of boiling water until it is free from excess of sulphurous acid and has been reduced to 5 Cc. in volume.

THE TEST

Before applying this test for the presence of arsenic in chemicals, in order to establish the freedom of the reagents from arsenic, sulphur, and phosphorus, or any interfering contaminations, a preliminary blank test should be made as follows: Into the flask are introduced 2 Gm. of zinc, 20 Cc. of the hydrochloric acid (see above), and 5 Cc. of water, and into the lower end of the neck of the flask is inserted a small wad of clean dry gauze, and then the lead acetate test-gauze, pressed with sufficient firmness to retain its place. About 1 Cm. space should be allowed above the gauze; the lip of the flask, after careful cleansing, is securely covered by folding over it the mercuric chloride test-paper. The reaction is allowed to proceed until the greater portion of the zinc has dissolved, which may require from one-half to two hours, when, if no trace of a yellow to orange-colored deposit is distinguishable upon the inner surface of the test-paper cap, the reagents are proved to be sufficiently pure, and a direct test may be applied at once. If a black stain is produced, sulphur compounds are present in the zinc or reagents, and this indicates unfitness for use. While the blank test is being carried out, another flask should be charged in a like manner with 2 Gm. of zinc and 20 Cc. of the hydrochloric acid (see above), followed by the 5 Cc. of the solution of the chemical (1 in 10) to be tested, which has undergone reduction as directed (under *Preparation of the Chemical to be tested*); the wad of clean dry gauze followed by the lead acetate test-gauze is then introduced, and after cleansing the lip of the flask the mercuric chloride cap is folded over the top. After the evolution of hydrogen has continued for at least one-half hour, and most of the zinc has dissolved, the inner side of the mercuric chloride test-cap is examined to detect the presence of a yellow stain.

The presence of arsenic much in excess of the permissible limit (1 in 100,000) is manifested by the formation of a distinct yellow to orange spot, according to the quantity present. Antimony produces a dark gray to brownish-black coloration. The production of a black stain indicates the presence of sulphur compounds (as sulphurous acid or sulphides), also possibly antimony. If the former be present, a simultaneous blackening of the lead acetate gauze will be observed. If such be the case, the operation, as directed under *Preparation of the Chemical to be tested*, must be repeated upon a fresh portion of the sample, using greater precautions for the complete removal of the sulphurous acid.

In testing such phosphorus compounds as hypophosphorous acid and the hypophosphites, special care should be observed to completely oxidize the sample as directed, otherwise a yellow stain, similar to that caused by arsenic, may be produced through the evolution of hydrogen phosphide.

Compounds containing antimony are tested for arsenic by Bettendorf's Test.

18. Barium Carbonate.—Purified barium carbonate, $BaCO_3$, is prepared by dissolving 12 parts of purified, crystallized barium chloride in 30 parts of boiling water, then adding 5 parts of ammonium carbonate, followed by 5 parts of ammonia water; finally washing the precipitate thoroughly and drying.

19. Barium Chloride Test Solution.—Prepared from purified, crystallized barium chloride, $BaCl_2 + 2H_2O$. The aqueous solution of the salt should be perfectly neutral and should not respond to the Time-Limit Test for Heavy Metals (see No. 121). The aqueous solution, after being precipitated by diluted sulphuric acid in slight excess, yields a filtrate which should not leave any permanent residue when evaporated and heated on platinum-foil (absence of *other fixed bases*). Diluted alcohol, after remaining in contact with it for several hours, should, upon ignition, show a pure yellowish-green flame free from red (absence of *traces of strontium*). To prepare the *test solution*, dissolve 10 Gm. of the salt in sufficient water to measure 100 Cc.

20. Barium Hydroxide Test Solution.—A saturated solution of crystallized barium hydroxide, $Ba(OH)_2 + 8H_2O$, in water. This solution rapidly absorbs carbon dioxide from the air. It should be freshly prepared when required for use.

21. Barium Nitrate Test Solution.—Prepared from pure barium nitrate, $Ba(NO_3)_2$. This salt should respond to the same tests as barium chloride (see No. 19). In addition, its aqueous solution, when slightly acidulated with nitric acid, should not be rendered turbid by silver nitrate T.S. (absence of *chloride*). To prepare the *test solution*, dissolve 10 Gm. of the salt in sufficient water to make 100 Cc.

22. Benzin, or **Petroleum Benzin.**—Use the official purified petroleum benzin [*Benzinum Purificatum*, U. S. P.].

23. Benzene, or **Benzole.**—Benzene, C_6H_6, is a colorless, transparent liquid of a peculiar, aromatic odor, sp. gr. 0.871 at 25° C. (77° F.), congealing at 5.2° C. (41.3° F.), and boiling at 80.4° C. (176.7° F.). It is insoluble in water, but soluble in 4 parts of alcohol, and in ether. When equal volumes of benzene and concentrated sulphuric acid are mixed, the latter should not become colored. On shaking 2 Cc. of benzene with 0.5 Cc. of sulphuric acid and 1 drop of fuming nitric acid, no green or blue tint should be produced (absence of *thiophene*).

24. Brazil-Wood Test Solution.—See under *Indicators* (No. 125).

25. Bromine Test Solution (Bromine Water).—An aqueous solution of bromine, Br [*Bromum*, U. S. P.], prepared by dissolving 1 Cc. of bromine in sufficient water to measure 100 Cc.

26. Calcium Chloride Test Solution.—Dissolve 10 Gm. of crystallized calcium chloride, $CaCl_2 + 6H_2O$, in sufficient water to measure 100 Cc.

27. Calcium Hydroxide Test Solution (Lime Water), $Ca(OH)_2$.—Use the official lime water [*Liquor Calcis*, U. S. P.].

28. Calcium Sulphate Test Solution.—Introduce pulverized transparent crystals of native gypsum (selenite), $CaSO_4 + 2H_2O$, into a bottle nearly filled with water, agitate at intervals for twelve hours, and decant the clear, saturated solution when required. One part of gypsum requires, at 25° C. (77° F.), 378 parts of water for solution.

29. Carbon Disulphide, CS_2.—Use the official carbon disulphide [*Carbonei Disulphidum*, U. S. P.].

30. Chlorine Test Solution (Chlorine Water).—Use the official chlorine water [*Liquor Chlori Compositus*, U. S. P.]. Since it deteriorates by keeping, it should be freshly prepared when required for use.

31. Chloroform, $CHCl_3$.—Use the official chloroform [*Chloroformum*, U. S. P.]. It should be strictly neutral to moistened litmus paper.

32. Cobaltous Nitrate Test Solution.—The crystallized, commercial salt, $Co(NO_3)_2 + 6H_2O$, is sufficiently pure, if, after it is dissolved in water, and the cobalt completely precipitated by ammonium sulphide T.S., the filtrate leaves no residue after evaporating and igniting. To prepare the *test solution*, dissolve 1 Gm. of the salt in 10 Cc. of water.

33. Cochineal Test Solution.—See under *Indicators* (No. 126).

34. Copper, Metallic, Cu, in the form of wire, foil, or turnings.

35. Cupric Ammonium Sulphate Test Solution.—A solution of cupri-tetrammonium sulphate, $CuSO_4 + 4NH_3 + H_2O$. To copper sulphate T.S. add ammonia water, until the precipitate first formed is nearly, but not completely, redissolved; then filter. This solution should be freshly made when required.

36. Cupric Sulphate Test Solution.—Dissolve 10 Gm. of cupric sulphate, $CuSO_4 + 5H_2O$ [*Cupri Sulphas*, U. S. P.], in sufficient water to measure 100 Cc.

37. Cupric Tartrate Test Solution.—See Volumetric Solutions (No. 133).

38. Diphenylamine Test Solution.—Prepared from diphenylamine, $(C_6H_5)_2NH$, which is in the form of grayish-white or colorless crystals, of a peculiar, aromatic odor, melting at 54° C. (129.2° F.), slightly soluble in water, more soluble in acids. It is used either in the dry state, or in solution in diluted sulphuric acid, as a test for nitric acid (in sulphuric acid, water, etc.), or for chlorine (in hydrochloric acid). To test a solution for the presence of nitric acid, a small portion of it is mixed with 1 or 2 drops of diphenylamine T.S., and then concentrated sulphuric acid, free from compounds of nitrogen, is poured in so as to form a layer beneath the solution. The presence of nitric acid is shown by a deep blue color at the zone of contact. A similar reaction is also produced by the presence of hypochlorites, chlorates, chromium trioxide, ferric salts, and similar oxidizing agents. The *test solution* is prepared by dissolving 0.1 Gm. of diphenylamine in 50 Cc. of diluted sulphuric acid. The solution should be colorless.

39. Ether, $(C_2H_5)_2O$.—Use the official ether [*Æther*, U. S. P.]. It should be strictly neutral to moistened litmus paper.

40. Ferric Ammonium Sulphate Test Solution.—Dissolve 10 Gm. of ferric ammonium sulphate, $FeNH_4(SO_4)_2 + 12H_2O$ [*Ferri et Ammonii Sulphas*, U. S. P.], in sufficient water to measure 100 Cc.

41. Ferric Chloride Test Solution.—Dissolve 10 Gm. of ferric chloride [*Ferri Chloridum*, U. S. P.] in sufficient water to measure 100 Cc.

42. Ferrous Sulphate Test Solution.—Dissolve a clear crystal of ferrous sulphate, $FeSO_4 + 7H_2O$ [*Ferri Sulphas*, U. S. P.], in about 10 parts of water which has been previously boiled to expel air. This solution should be freshly prepared immediately before use.

43. Ferrous Sulphide, FeS.—A heavy solid, in the form of black or brownish-black irregular masses, or fused into sticks, soluble in diluted sulphuric or diluted hydrochloric acid, with copious evolution of hydrogen sulphide.

44. Gelatin Test Solution.—Dissolve 1 Gm. of purified gelatin [*Gelatinum*, U. S. P.] in 50 Cc. of water, with the aid of a gentle heat, and filter if necessary. This solution should be freshly made when wanted for use.

45. Gold Chloride Test Solution.—The commercial gold chloride, usually prepared by dissolving gold in nitro-hydrochloric acid and carefully evaporating to dryness, consists chiefly of chlorauric acid, $HAuCl_4 + 4H_2O$, which is converted into neutral auric chloride, $AuCl_3$, by fusing it at a temperature not exceeding 150° C. (302° F.), moistening the residue (now consisting of auric and aurous chloride) with enough hot water to produce a syrupy liquid (whereby the aurous chloride is decomposed into auric chloride and metallic gold), and then pouring off the clear liquid from the precipitate. To prepare the *test solution*, mix the liquid finally obtained in the before-mentioned process with 20 volumes of water. Or, dissolve 1 Gm. of dry auric chloride in 30 Cc. of water.

46. Hydrochloric Acid, Pure, for Tests, HCl.—In addition to the tests prescribed for this acid [*Acidum Hydrochloricum*, U. S. P.], it is required to conform to the following more rigorous tests, before it can be employed as a reagent: The addition of 1 Cc. of barium chloride T.S. to 1 Cc. of the acid diluted with 9 Cc. of water should cause no turbidity within twenty-four hours (absence of *sulphuric acid*). A crystal of diphenylamine dropped into the acid should not turn blue (absence of *free chlorine*).

47. Hydrogen Sulphide, H_2S.—A gas generated by treating ferrous sulphide with diluted sulphuric acid, and washing the gas as directed under the Test Solution (No. 48).

48. Hydrogen Sulphide Test Solution (Hydrosulphuric Acid).—A saturated, aqueous solution of hydrogen sulphide. To prepare about 1000 Cc. of the solution, treat 20 Gm. of ferrous sulphide, in a suitable apparatus, with a mixture of 20 Cc. of sulphuric acid (U. S. P.), and 250 Cc. of water, pass the gas through a drying-tube filled with granulated calcium chloride, then from this through a tube of about 8 millimeters diameter and 40 centimeters in length, which contains about 5 Gm. of coarsely pulverized iodine mixed with spun glass (glass wool), and finally through a wash-bottle which contains a small quantity of potassium iodide T.S. The gas thus purified is conducted nearly to the bottom of a bottle of the capacity of about 1500 Cc., containing 1000 Cc. of cold water. The bottle should be shaken occasionally to facilitate the solution of the gas. When it is no longer absorbed, transfer the solution to small, dark amber-colored bottles, to be filled nearly to the top; pass a stream of hydrogen sulphide for a few minutes through each, and then at once stopper them tightly, and preserve them afterwards in a cool and dark place. Before any of the solution is used, it should be ascertained that it retains a strong odor of hydrogen sulphide, and that, when it is added to an equal volume of ferric chloride T.S., a copious precipitate of sulphur is formed at once.

49. Indicators.—See special list, page 541.

50. Indigo Test Solution.—Dissolve 1 Gm. of commercial indigo-carmine, which is the sodium or potassium salt of indigo-disulphonic acid, $H_2C_{16}H_8N_2O_2(SO_3)_2$, in 150 Cc. of water.

51. Iodine Absorption Value of Fats and Oils.—The iodine value or number of a fat or an oil is a figure which indicates the percentage of iodine absorbed under certain conditions. It is determined as follows: To a solution of 0.3 Gm.* of the fat or oil in 10 Cc. of chloroform contained in a glass-stoppered bottle of 250 Cc. capacity, add 25 Cc. of a mixture of equal volumes of alcoholic iodine T.S., and alcoholic mercuric chloride T.S., both of which have been measured from a burette. After having been securely stoppered, the bottle is set aside in a cool place, protected from the light, for a period of four† hours. After this time, the mixture must still possess a brown color; if it does not, a further measured portion of the mixture of the two reagents should be added, and the mixture be again set aside. Finally, 20 Cc. of potassium iodide T.S. are added, followed by 50 Cc. of water, and tenth-normal sodium thiosulphate V.S. is then added in small successive portions, shaking thoroughly after each addition until the color of the mixture is discharged. The number of Cc. of the sodium thiosulphate V.S. consumed is noted. At the same time that this test is carried out, a blank experiment is made in which exactly the same quantities of chloroform, iodine T.S., and mercuric chloride T.S. are mixed, and after standing for four or more hours, the free iodine is estimated by titration with tenth-normal sodium thiosulphate V.S. as directed above. The number of Cc. of the thiosulphate V.S. consumed is noted, and from this is deducted the number of Cc. of the thiosulphate V.S. which was consumed in the test; the difference multiplied by 12.59, and this product divided by 3,‡ gives the iodine value of the fat or oil.

52. Iodine Test Solution.—For preparing the ordinary test solution (as a reagent for starch, alcohol by iodoform test, etc.), iodine, I, fulfilling the requirements of the Pharmacopœia [*Iodum*, U. S. P.], is sufficiently pure. Dissolve 1 Gm. of iodine and 3 Gm. of potassium iodide in 50 Cc. of water.

For use in volumetric analysis, or in other cases where the ordinary impurities present in official iodine are objectionable, *Purified Iodine* must be employed (see No. 137).

53. Iodine Test Solution, Alcoholic.—Dissolve 25 Gm. of iodine [*Iodum*, U. S. P.] in 500 Cc. of alcohol. This solution is employed in the determination of the iodine absorption value of fats and oils (No. 51).

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* 0.15 to 0.2 Gm. for linseed oil and 0.8 Gm. for oil of theobroma and similar fats.

† Sixteen hours are required for accuracy in the case of linseed oil.

‡ When the quantity of the fat or oil used is not 0.3 Gm., then the product is not divided by 3, but by the figure corresponding to the quantity taken; thus, for linseed oil, 0.15 Gm. would be divided by 1.5.

54. Iron, Metallic, Fe.—Bright and perfectly clean iron in the form of wire, sheet, filings, or electrolytically reduced to powder, according to the uses to be made of it. For making solutions of pure iron salts, fine, thin, bright wire (so-called florist's or piano wire) should be used. For detecting copper, bright pieces of sheet iron or steel knitting-needles are used.

55. Lead Acetate Test Solution.—Dissolve 10 Gm. of clear, transparent crystals of lead acetate, $Pb(C_2H_3O_2)_2 + 3H_2O$ [*Plumbi Acetas*, U. S. P.], free from adhering lead carbonate, in sufficient water to measure 100 Cc. Preserve the solution in well-stoppered bottles.

56. Lead Acetate Test Solution, Basic.—Use the official solution of lead subacetate [*Liquor Plumbi Subacetatis*, U. S. P.].

57. Litmus Paper and **Test Solution.**—See under *Indicators* (No. 129).

58. Magnesia Mixture.—Dissolve 10 Gm. of magnesium sulphate, $MgSO_4 + 7H_2O$ [*Magnesii Sulphas*, U. S. P.], and 20 Gm. of ammonium chloride, NH_4Cl [*Ammonii Chloridum*, U. S. P.], in 80 Cc. of water, add 42 Cc. of ammonia water [*Aqua Ammoniæ*, U. S. P.], set the mixture aside for a few days in a well-stoppered vessel, and filter. If not perfectly clear, the solution should always be filtered before using.

59. Magnesium Sulphate Test Solution.—Dissolve 10 Gm. of magnesium sulphate, $MgSO_4 + 7H_2O$ [*Magnesii Sulphas*, U. S. P.], in sufficient water to measure 100 Cc.

60. Mercuric Chloride Test Solution.—Dissolve 5 Gm. of mercuric chloride, $HgCl_2$ [*Hydrargyri Chloridum Corrosivum*, U. S. P.], in sufficient water to measure 100 Cc.

61. Mercuric Chloride Test Solution, Alcoholic.—Dissolve 30 Gm. of mercuric chloride, $HgCl_2$ [*Hydrargyri Chloridum Corrosivum*, U. S. P.], in 500 Cc. of alcohol. This solution is employed in the determination of the iodine absorption value of fats and oils (No. 51).

62. Mercuric Nitrate Test Solution, $Hg(NO_3)_2 + 4H_2O$.—Use the official solution of mercuric nitrate [*Liquor Hydrargyri Nitratis*, U. S. P.].

63. Mercuric Potassium Iodide Test Solution (*Mayer's Reagent*).—Dissolve 1.344 Gm. of mercuric chloride, $HgCl_2$ [*Hydrargyri Chloridum*

Corrosivum, U. S. P.], in 60 Cc. of water, and 5 Gm. of potassium iodide [*Potassii Iodidum*, U. S. P.] in 10 Cc. of water. Mix the two solutions, and then add sufficient water to make the mixture measure 100 Cc.

64. Mercuric Potassium Iodide Test Solution, Alkaline (*Nessler's Reagent*).—Dissolve 10 Gm. of potassium iodide [*Potassii Iodidum*, U. S. P.] in 10 Cc. of water, and add gradually, in portions, a saturated aqueous solution of mercuric chloride [*Hydrargyri Chloridum Corrosivum*, U. S. P.], with constant agitation, until a slight red precipitate remains undissolved; to this mixture add 30 Gm. of potassium hydroxide [*Potassii Hydroxidum*, U. S. P.] and, when solution has taken place, 1 Cc. more of the saturated aqueous solution of mercuric chloride. Dilute this solution with water until it measures 200 Cc. Allow the precipitate to subside, and draw off the clear fluid.

NOTE.—2 Cc. of this reagent, when added to 50 Cc. of water containing 0.05 milligramme of ammonia, should produce at once a yellowish-brown coloration.

65. Mercurous Nitrate Test Solution.—Into a porcelain evaporating dish introduce 10 Gm. of pure mercury with 5 Cc. of pure nitric acid and 5 Cc. of distilled water, and set it aside for 24 hours in a cool, dark room. Separate and drain the crystals ($2HgNO_3 + H_2O$), and dissolve them in 100 Cc. of water. Preserve the solution in a dark amber-colored bottle, into which a small quantity of mercury has been introduced.

66. Metals, Time-Limit Test for Heavy.—See No. 121.

67. Modified Gutzeit's Test.—See No. 17.

68. Methyl Alcohol, CH_3OH.—Rectified, purified wood-alcohol, having a specific gravity of about 0.812 at 25° C. (77° F.), and free from pyroligneous odor. Used for the identification of salicylic acid.

69. Methyl-Orange Test Solution.—See under *Indicators* (No. 130).

70. Naphthylamine Acetate Test Solution.—Boil 0.1 Gm. of alpha-naphthylamine acetate ($C_{10}H_7NH_2.HC_2H_3O_2$) in 20 Cc. of distilled water, filter through cotton, and mix the filtrate with 180 Cc. of diluted acetic acid (10 percent. absolute acid). Only freshly distilled water should be employed in preparing this reagent, which must be kept in well-stoppered bottles, protected from the light.

71. Nitric Acid, HNO_3.—Use the official nitric acid [*Acidum Nitricum*, U. S. P.].

72. Nitric Acid, Fuming.—Use the commercial red fuming acid, if it is of the specific gravity 1.437 at 25° C. (77° F.). It should be carefully kept in glass-stoppered bottles, in a cool place.

73. Oxalic Acid, Pure, $H_2C_2O_4 + 2H_2O$.—*Pure Oxalic Acid* is in the form of colorless, transparent, clino-rhombic crystals; 10 Gm. on ignition upon platinum foil should leave no residue. One part of the acid is completely soluble in 12 parts of water at 25° C. (77° F.). For the preparation of test and volumetric solutions, commercial oxalic acid should be purified as follows:

To 1 part of the Acid add 10 parts of cold water, and shake until the latter is saturated. Filter off the solution from the undissolved crystals, evaporate the filtrate to about three-fourths of its volume, and set it aside so that the fixed salts which it contains may crystallize out. Carefully decant the liquid from the crystals, concentrate it by evaporation, and set it aside to crystallize, stirring occasionally to prevent the formation of large crystals which might enclose moisture. Drain the crystals in a funnel, dry them carefully on blotting paper, and preserve them in well-stoppered bottles.

74. Oxalic Acid Test Solution.—Dissolve 10 Gm. of pure oxalic acid, $H_2C_2O_4 + 2H_2O$, in sufficient distilled water to measure 100 Cc.

75. Palladous Chloride Test Solution.—Dissolve 0.5 Gm. of palladous chloride, $PdCl_2$, in sufficient water to measure 10 Cc. Preserve in a glass-stoppered bottle.

76. Phenolphthalein Test Solution.—See under *Indicators* (No. 131).

77. Picric Acid Test Solution.—Dissolve 1 Gm. of pure, distinctly crystalline picric acid (trinitrophenol), $C_6H_2(NO_2)_3OH$, in 100 Cc. of water, cool the solution and filter, if necessary.

78. Platinic Chloride Test Solution.—Dissolve 2.6 Gm. of chloroplatinic acid, $H_2PtCl_6 + 6H_2O$, in 20 Cc. of water. On evaporating a small portion of the solution to dryness and igniting the residue, pure metallic platinum should remain, which should yield nothing soluble in nitric acid.

79. Potassio-Mercuric Iodide Test Solution.—See No. 63.

80. Potassium Bitartrate, $KHC_4H_4O_6$.—The purification of potassium bitartrate [*Potassii Bitartras*, U. S. P.], to render it suitable for standardizing volumetric solutions of potassium and sodium hydroxide, is carried out as follows : To 100 Gm. of the salt contained in a beaker, is added a mixture of 85 Cc. of water and 25 Cc. of diluted hydrochloric acid ; the covered beaker is then placed upon a bath of boiling water and the mixture digested, with occasional stirring, for three hours. After quickly cooling, the solution is drained off from the precipitate, which is washed by affusion and decantation with two successive portions of 100 Cc. each of water ; after collecting the precipitate upon a plain filter, the washing with cold water is continued until the filtrate, after adding a few drops of nitric acid, ceases to become opalescent upon the addition of silver nitrate T.S. The precipitate of potassium bitartrate is then dissolved in the smallest possible volume of boiling water (about 1500 Cc.), filtered, and the filtrate, while being rapidly cooled, is constantly stirred. When the mixture is cold, the crystalline precipitate is collected upon a plain filter, washed with 300 Cc. of cold water, and, after thoroughly draining, dried at 120° C. (248° F.) until of constant weight. It should be kept in dry, securely stoppered bottles.

Purified potassium bitartrate is employed for standardizing normal and tenth-normal potassium or sodium hydroxide V.S.

81. Potassium Bromate, $KBrO_3$.—White cubical crystals or granular crystalline powder, having a pungent, saline taste. Soluble in 15.5 parts of water at 25° C. (77° F.), and in 2 parts of boiling water ; slightly soluble in alcohol. The aqueous solution has a neutral reaction, and upon the addition of diluted sulphuric acid no yellow color should at once be produced. When heated to 350° C. (662° F.), the salt undergoes decomposition with the evolution of oxygen. Potassium Bromate should not be triturated or heated with organic or easily oxidizable substances. The addition of nitric acid or sulphuric acid to the salt causes decomposition with the evolution of bromine. If 0.1 Gm. of Potassium Bromate, dried at 100° C. (212° F.), and 2 Gm. of potassium iodide be dissolved in about 25 Cc. of water contained in a glass-stoppered bottle (of about 100 Cc. capacity), and, after the addition of 5 Cc. of hydrochloric acid, the bottle be securely stoppered and set aside for ten minutes, not less than 36.1 Cc. of tenth-normal sodium thiosulphate V.S. should be required to discharge the color, corresponding to 99.8 percent. of pure Potassium Bromate.

82. Potassium Carbonate Test Solution.—Dissolve 10 Gm. of anhydrous potassium carbonate, K_2CO_3, prepared by heating potassium carbonate [*Potassii Carbonas*, U. S. P.] to 130° C. (266° F.), in sufficient water to measure 100 Cc.

83. Potassium Chromate Test Solution.—Dissolve 10 Gm. of yellow potassium chromate, K_2CrO_4, in sufficient water to measure 100 Cc. On adding silver nitrate T.S. to a few drops of the solution diluted with a little distilled water, a red precipitate is produced which should be completely soluble in nitric acid (absence of *chloride*). Another portion of the solution, mixed with an equal volume of diluted hydrochloric acid, should yield no precipitate with barium chloride T.S. (absence of *sulphate*). Another portion of the solution should not become turbid upon the addition of ammonia water or ammonium oxalate T.S. (absence of *alkaline earths*). A solution of 0.1 Gm. of the salt in 20 Cc. of water should not become red upon the addition of a few drops of phenolphthalein T.S. (limit of *free alkalies*).

84. Potassium Cyanide Test Solution.—Dissolve 1 Gm. of potassium cyanide, KCN [*Potassii Cyanidum*, U. S. P.], in sufficient water to measure 10 Cc. This solution should be freshly prepared when required.

85. Potassium Dichromate, Pure, $K_2Cr_2O_7$.—In addition to the tests prescribed for this salt in the text of the Pharmacopœia, it is required to conform to more rigorous tests before it can be used in the preparation of the tenth-normal volumetric solution. In a solution of 0.5 Gm. of the salt in 10 Cc. of water rendered acid by 0.5 Cc. of nitric acid, no turbidity should be produced by barium chloride T.S. (absence of *sulphates*).

To 10 Cc. of the aqueous solution of the salt (1 in 20), the addition of 1 Cc. of ammonia water, followed by 1 Cc. of ammonium oxalate T.S., should produce no turbidity (absence of *calcium*).

If to a solution of 0.5 Gm. of the salt in 20 Cc. of water, sufficient sulphurous acid be added to impart a strong odor of the reagent, and the mixture be boiled for about three minutes and cooled, the addition of 1 Cc. of nitric acid and a few drops of silver nitrate V.S. should produce no turbidity (absence of *chlorides*).

Potassium dichromate which fails to meet all of the above requirements may be purified by recrystallization, the hot, saturated aqueous solution of the salt being rapidly cooled with agitation. The granular crystals, after being collected on a plain filter and washed with sufficient *cold* water to remove the mother liquor, are thoroughly drained and then dried at 120° C. (248° F.). This recrystallization should be repeated until the salt responds to all of the above tests for purity.

86. Potassium Dichromate Test Solution.—Dissolve 10 Gm. of pure potassium dichromate (No. 85) in sufficient water to measure 100 Cc.

87. Potassium Ferricyanide Test Solution.—Dissolve 1 part of potassium ferricyanide, $K_3Fe(CN)_6$, in about 10 parts of water. This solution should be freshly made when required, as it undergoes decomposition with formation of ferrocyanide on standing. A freshly prepared aqueous solution, when mixed with some ferric chloride T.S. which has been well diluted with water, should show a brown tint, free from turbidity or a shade of green. Potassium Ferricyanide should respond to the tests for the absence of sulphates and chlorides as described under Potassium Ferrocyanide (No. 88).

88. Potassium Ferrocyanide, $K_4Fe(CN)_6 + 3H_2O$.—In the form of large, soft, transparent, yellow, four-sided, monoclinic tabular crystals, odorless, and having a mild, saline taste. Slightly efflorescent on exposure to dry air.

Soluble in three parts of water at 25° C. (77° F.), and in 2 parts of boiling water; insoluble in alcohol. The aqueous solution is neutral to litmus paper. No effervescence should be caused by the addition of diluted sulphuric acid to a concentrated solution of the salt (absence of *carbonate*).

The aqueous solution (1 in 20), acidulated with hydrochloric acid, should, upon the addition of barium chloride T.S., remain clear (absence of *sulphate*). If a mixture of 0.5 Gm. of the salt with 1.5 Gm. of pure potassium nitrate and 0.5 Gm. of pure anhydrous sodium carbonate be heated to redness in a porcelain crucible, the residue dissolved in water, and the filtered solution supersaturated with nitric acid, no turbidity should be produced upon the addition of silver nitrate T.S. (absence of *chloride*). The precipitate produced in the aqueous solution, acidulated with nitric acid, by silver nitrate T.S. should be of a pure white color, without a tinge of red (absence of *ferricyanide*).

89. Potassium Ferrocyanide Test Solution.—Dissolve 10 Gm. of potassium ferrocyanide, $K_4Fe(CN)_6 + 3H_2O$, in sufficient water to measure 100 Cc.

90. Potassium Hydroxide Test Solution.—Use the official solution of potassium hydroxide, KOH [*Liquor Potassii Hydroxidi,* U. S. P.].

91. Potassium Hydroxide Test Solution, Alcoholic.—Use the half-normal alcoholic potassium hydroxide V.S. (Nos. 99 and 144).

92. Potassium Iodide Test Solution.—Dissolve 20 Gm. of potassium iodide, KI [*Potassii Iodidum,* U. S. P.], in sufficient water to measure 100 Cc., and keep the solution in dark amber-colored, well-stoppered bottles. The solution should be frequently renewed.

93. Potassium Nitrate, KNO_3.—The dry salt [*Potassii Nitras,* U. S. P.], responding to the tests of purity required by the Pharmacopœia. It should also be free from chlorides and sulphates.

94. Potassium Permanganate Test Solution, $KMnO_4$.—Use No. 145.

95. Potassium Sulphate Test Solution.—Dissolve 1 Gm. of potassium sulphate, K_2SO_4, in sufficient water to measure 100 Cc.

96. Potassium Sulphocyanate, KSCN.—Colorless, prismatic crystals, of cooling, saline taste, and hygroscopic in moist air. Readily soluble in less than its own weight of water; soluble in 10 parts of absolute alcohol.

The aqueous solution of the salt (1 in 20) should not become turbid within five minutes upon the addition of barium chloride T.S. (limit of *sulphate*).

The aqueous solution (1 in 20), after the addition of 1 Cc. of diluted hydrochloric acid, should remain colorless (absence of *iron*), and should not respond to the Time-Limit Test for Heavy Metals (No. 121).

97. Potassium Sulphocyanate Test Solution.—Use the tenth-normal volumetric solution (No. 146).

98. Resins, etc., Acid Number for.—Dissolve 1 Gm. of the resinous substance in alcohol, add a few drops of phenolphthalein T.S., and titrate with normal potassium hydroxide V.S.; the amount of potassium hydroxide consumed (expressed in milligrammes) is termed the Acid Number. The reaction is often more distinct if an excess of normal potassium hydroxide V.S. be used and the solution titrated back with normal acid V.S.

99. Saponification Value of Fats and Oils.—The determination of the saponification value is conducted as follows: Weigh out accurately, in a flask holding 150 to 200 Cc., 1.5 to 2 Gm. of the purified and filtered fat. Next run into the flask, with a burette, 25 Cc. of alcoholic potassium hydroxide T.S. (see No. 144). While exactly 25 Cc. is not indispensable, in comparative tests precisely the same amount must be used, allowing the burette to drain in exactly the same way in each test. Then place a small funnel in the flask and heat it on a water-bath containing boiling water, for half an hour, so that the alcohol is simmering, frequently imparting a rotatory motion to the contents of the flask. Then add 1 Cc. of phenolphthalein T.S., and titrate back the excess of potassium hydroxide with half-normal hydrochloric acid V.S. A blank test is made at the same time, using the alcoholic potassium hydroxide T.S. alone; the difference in the number of cubic centimeters of half-normal hydrochloric acid V.S. consumed by the blank test and the real test, multiplied by 27.87, and divided by the weight in grammes of the fat or oil, will give the saponification equivalent of the sample tested.

100. Silver Ammonium Nitrate Test Solution.—Dissolve 1 Gm. of silver nitrate, $AgNO_3$ [*Argenti Nitras*, U. S. P.], in 20 Cc. of water, and add ammonia water, drop by drop, until the precipitate first produced is almost, but not entirely, redissolved. Filter the solution, and preserve it in dark amber-colored and well-stoppered bottles.

101. Silver Nitrate Test Solution, $AgNO_3$.—For ordinary purposes, use the tenth-normal volumetric solution (see No. 147).

102. Silver Sulphate Test Solution.—Dissolve 1 Gm. of silver nitrate [*Argenti Nitras*, U. S. P.] in 0.5 Cc. of warm water, and add 1.5 Cc. of pure, concentrated sulphuric acid. On cooling, small transparent crystals of silver sulphate, Ag_2SO_4, separate. Carefully pour off the acid liquid, wash the crystals repeatedly, by decantation, with cold water, transfer them to a bottle, add 100 Cc. of water, and agitate so as to produce a saturated solution. For use, decant a sufficient quantity of the latter.

103. Sodium Acetate Test Solution.—Dissolve 10 Gm. of sodium acetate, $NaC_2H_3O_2 + 3H_2O$ [*Sodii Acetas*, U. S. P.], in sufficient water to measure 100 Cc.

104. Sodium Bitartrate Test Solution, $NaHC_4H_4O_6 + H_2O$.—To a solution of 3.5 Gm. of tartaric acid [*Acidum Tartaricum*, U. S. P.] in about 80 Cc. of boiling water, add gradually, in small portions, monohydrated sodium carbonate [*Sodii Carbonas Monohydratus*, U. S. P.]

until the solution has a neutral reaction; to this liquid is now added 3.5 Gm. of tartaric acid, and after filtering and cooling, sufficient water is added to the solution to measure 100 Cc. This solution should be freshly prepared when required.

105. Sodium Carbonate.—The monohydrated salt, $Na_2CO_3 + H_2O$, conforming to the tests prescribed by the Pharmacopœia [*Sodii Carbonas Monohydratus*], but absolutely free from chloride and sulphate.

106. Sodium Carbonate Test Solution.—Dissolve 10 Gm. of monohydrated sodium carbonate, $Na_2CO_3 + H_2O$ [*Sodii Carbonas Monohydratus*, U. S. P.], in sufficient water to measure 100 Cc.

107. Sodium Cobaltic Nitrite Test Solution, $Co_2(NO_2)_6.6NaNO_2 + H_2O$.—Dissolve 4 Gm. of cobaltous nitrate, $Co(NO_3)_2 + 6H_2O$, and 10 Gm. of sodium nitrite, $NaNO_2$, in about 50 Cc. of water, add 2 Cc. of acetic acid [*Acidum Aceticum*, U. S. P.], and dilute with sufficient water to measure 100 Cc. A few drops of acetic acid should be added to the solution from time to time. The reagent should not be kept longer than three months.

108. Sodium Hydroxide Test Solution, NaOH.—Use the official solution of sodium hydroxide [*Liquor Sodii Hydroxidi*, U. S. P.].

109. Sodium Nitrite, $NaNO_2$.—The purest commercial salt, either granulated or in the form of sticks, is sufficiently pure.

110. Sodium Nitroprusside Test Solution.—Dissolve 1 part of sodium nitroprusside, $Na_2Fe(NO)(CN)_5 + 2H_2O$, in 19 parts of water immediately before using.

111. Sodium Phosphate Test Solution.—Dissolve 10 Gm. of sodium phosphate, $Na_2HPO_4 + 12H_2O$ [*Sodii Phosphas*, U. S. P.], in sufficient water to measure 100 Cc.

112. Sodium Tartrate Test Solution, $Na_2C_4H_4O_6 + 2H_2O$.—To a solution of 6.5 Gm. of tartaric acid [*Acidum Tartaricum*, U. S. P.] in about 80 Cc. of boiling water, add gradually, in small portions, monohydrated sodium carbonate [*Sodii Carbonas Monohydratus*, U. S. P.] until the solution has a neutral reaction; after filtering and cooling, add sufficient water to measure 100 Cc. This solution should be freshly prepared when required.

113. Sodium Thiosulphate, $Na_2S_2O_3 + 5H_2O$.—In addition to the tests prescribed for this salt in the text of the Pharmacopœia [*Sodii Thiosulphas*], it is required to conform to the following more rigorous tests before it can be used in preparing the standard volumetric solution. If to a solution of the salt (1 in 20) in distilled water, iodine T.S. be added, drop by drop, until it retains a faint but permanent brown color, no turbidity should be produced upon the addition of barium chloride T.S. (absence of *sulphates* and *sulphites*). The addition of 1 drop of phenolphthalein T.S. to the aqueous solution of the salt (1 in 10) should produce not more than a very faint rose-tint (absence of *free alkalies*). The aqueous solution of the salt (1 in 20) should not become cloudy upon the addition of ammonium oxalate T.S. (absence of *calcium salts*).

114. Sodium Thiosulphate Test Solution.—Use the tenth-normal volumetric solution (No. 151).

115. Stannous Chloride Test Solution.—Heat pure tin (see No. 122), in the form of foil or granules, with concentrated hydrochloric acid, taking care that the metal be in excess. When the acid is saturated, crystals of stannous chloride, $SnCl_2 + 2H_2O$, begin to form. Remove and drain these, dissolve them in 10 parts of water, and preserve the solution in well-stoppered bottles, into each of which a fragment of pure tin, or a piece of pure tin-foil, has previously been introduced.

For Bettendorf's test (see No. 16), pure concentrated hydrochloric acid (which responds to the U. S. P. tests of purity) is saturated with the *freshly prepared* crystals.

116. Starch Test Solution.—Triturate 1 Gm. of starch [*Amylum*, U. S. P.] with 10 Cc. of cold water, and then add sufficient boiling water, with constant stirring, to make about 200 Cc. of a thin, translucent fluid. This solution should be freshly prepared and filtered when required for use.

117. Sulphanilic Acid Test Solution.—Dissolve 0.5 Gm. of sulphanilic acid, $C_6H_4(NH_2).(SO_3H)$ (para-amidobenzenesulphonic acid), in 150 Cc. of diluted acetic acid (10 percent. absolute acetic acid). Only freshly distilled water should be employed in preparing the diluted acetic acid.

This reagent should be kept in well-stoppered bottles.

118. Sulphuric Acid, Pure, for Tests, H_2SO_4.—The sulphuric acid of the Pharmacopœia, which has a specific gravity of 1.826 at 25° C.

(77° F.), will answer as a reagent for most purposes, provided it is of the required degree of purity. But when "concentrated" sulphuric acid is specially directed in a test, it is intended that the strongest obtainable pure acid, of a specific gravity of not less than 1.834 at 25° C. (77° F.), be employed.

In addition to the tests prescribed for this acid in the text of the Pharmacopœia, it is required to conform to the following more rigorous tests before it can be employed as a reagent. If 1 Cc. of diphenylamine T.S. (see No. 38) be carefully poured, as a separate layer, upon 5 Cc. of sulphuric acid, contained in a test-tube, no distinct blue color should appear in the zone of contact (absence of *nitric acid*).

119. Tannic Acid Test Solution.—Dissolve 1 Gm. of tannic acid, $HC_{14}H_9O_9$ [*Acidum Tannicum*, U. S. P.], in 1 Cc. of alcohol, and add sufficient water to measure 10 Cc.

120. Tartaric Acid Test Solution.—Dissolve 1 part of tartaric acid, $H_2C_4H_4O_6$ [*Acidum Tartaricum*, U. S. P.], in 3 parts of water. It should be prepared only as wanted.

121. Time-Limit Test for Heavy Metals.—This test is to be used to detect the presence of undesirable metallic impurities in official chemical substances or their solutions; these should not respond affirmatively within the stated time.

Ten Cc. of a solution of the substance in distilled water (1 in 20),* contained in a test-tube of about 40 Cc. capacity, is acidulated with 1 Cc. of diluted hydrochloric acid (unless otherwise directed), warmed to about 50° C. (122° F.), and an equal volume of freshly prepared hydrogen sulphide T.S. added, and the mixture allowed to stand, in the well-stoppered test-tube, in a warm place, at 35° C. (95° F.) for at least half an hour. At the end of this time any coloration or turbidity is carefully noted, ammonia water is added in excess, and the solution again examined for a coloration or turbidity.

Before the addition of the ammonia water, the mixture should still possess the odor of hydrogen sulphide; if not, it should be thoroughly saturated with the gas and again set aside for half an hour.

Any change in the color of the solution which is being tested should be noted by comparison with the same volume of the hydrogen sulphide T.S. (which has been likewise acidulated), when viewed crosswise by reflected light while held against a white surface.

Antimony yields, upon the addition of hydrogen sulphide T.S. to highly diluted solutions, a pale yellow to orange color, or, to more concentrated solutions, an orange precipitate, which is soluble in test solutions of potassium hydroxide and ammonium sulphide, as well as in strong hydrochloric acid. The precipitate is insoluble in test solution of ammonium carbonate. The addition of ammonia water to the highly diluted hydrogen sulphide solution of antimony slightly intensifies the coloration.

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* The dilution (1 in 20) has been extended, except as stated below, by the Committee of Revision to a total dilution of 1 in 100; for iron the total dilution is extended to 1 in 300. Exception: For chemical substances to be tested for antimony, and arsenic, the dilution has not been extended, but remains at 1 in 20.

Arsenic yields, upon the addition of hydrogen sulphide T.S. to highly diluted solutions, a pale yellow color, or, to more concentrated solutions, a yellow precipitate, which is soluble in test solutions of potassium hydroxide, ammonium sulphide, and ammonium carbonate, but is reprecipitated upon the addition of hydrochloric acid, insoluble in excess. The addition of ammonia water to the highly diluted hydrogen sulphide solution of arsenic slightly intensifies the yellow color.

Cadmium in very dilute solutions gives, with hydrogen sulphide T.S. or ammonium sulphide T.S., a pale yellow color; it yields in more concentrated solutions (not excessively acid) a yellow precipitate, which is insoluble in cold diluted hydrochloric acid, potassium hydroxide T.S., or ammonium sulphide T.S. (distinction from *arsenic*), and in solution of potassium cyanide. This precipitate is soluble in nitric and hydrochloric acids and in hot diluted hydrochloric and sulphuric acids.

Copper yields, upon the addition of hydrogen sulphide T.S. to highly diluted solutions, a pale brown color, or, to more concentrated solutions, a brownish-black precipitate, which is insoluble in diluted hydrochloric acid and test solution of potassium hydroxide, and is but very slightly soluble in test solution of ammonium sulphide. The precipitate is soluble in warm diluted nitric acid and also in solution of potassium or sodium cyanide. The addition of ammonia water to the highly diluted hydrogen sulphide solution containing copper slightly intensifies the coloration.

Iron.—Acidified solutions of ferrous iron do not react with hydrogen sulphide T.S., but yield a dark coloration or black precipitate with ammonium sulphide T.S., or upon the addition of ammonia water to the hydrogen sulphide mixture. This latter precipitate is soluble in cold diluted hydrochloric acid.

Acidified solutions of ferric iron yield a white turbidity or precipitate of sulphur upon the addition of hydrogen sulphide T.S., but a dark coloration or black precipitate with ammonium sulphide T.S., or upon the addition of ammonia water to the hydrogen sulphide mixture. This precipitate is readily soluble in acetic and inorganic acids.

Lead yields, upon the addition of hydrogen sulphide T.S. or ammonium sulphide T.S. to highly diluted solutions, a pale brown coloration, or, to more concentrated solutions, a black precipitate, which is insoluble in diluted hydrochloric acid, and also in test solutions of potassium hydroxide and ammonium sulphide.

Zinc yields, with ammonium sulphide T.S., and with hydrogen sulphide T.S., either in neutral solution, or after acidulation with acetic acid (in the absence of free mineral acids), a white turbidity in highly diluted solutions, but with concentrated solutions a white precipitate soluble in hydrochloric acid and insoluble in acetic acid.

122. Tin.—Pure metallic tin, Sn, in the granulated or mossy condition. Its solution in hydrochloric acid should give no precipitate with potassium sulphate T.S. (absence of *lead*), and, when tested by the Modified Gutzeit's Test (No. 17), replacing the zinc by tin, the diluted hydrochloric acid by hydrochloric acid U. S. P., and adding 1 drop of platinic chloride T.S., the mercuric chloride cap should not become colored within the time required for the solution of the metal (absence of *arsenic*).

123. Turmeric Paper and Tincture.—See under *Indicators* (No. 132).

124. Zinc.—Pure metallic zinc, Zn [*Zincum*, U. S. P.]. See also Modified Gutzeit's Test (No. 17).

Indicators for Acidimetry, Alkalimetry, etc.

NOTE.—Each test solution used as *indicator* should be examined as soon as prepared, and afterwards from time to time, as to its neutrality. If necessary, it should be brought, by the cautious addition of highly diluted sulphuric acid, or of a very dilute solution of an alkali, to such a point that, when a few drops of it are added to 25 Cc. of water, a few drops of a hundredth-normal acid or alkali V.S., respectively, will distinctly develop the appropriate tints.

Since many of the colored test solutions are injured by exposure to light, it is best to preserve them in dark amber-colored vials. Papers prepared with them should be kept in dark bottles or paper boxes.

125. Brazil-Wood Test Solution.—Boil 50 Gm. of finely cut Brazil-wood [the heart-wood of *Peltophorum dubium* (Sprengel) Britton, Fam. *Leguminosæ*] with 100 Cc. of water during half an hour, replacing the water from time to time. Allow the mixture to cool, strain, wash the contents of the strainer with water until 100 Cc. of strained liquid are obtained, add 25 Cc. of alcohol, and filter. Care should be taken to exclude ammoniacal vapors while filtering. This solution is turned purplish-red by alkalies, and yellow by acids.

126. Cochineal Test Solution.—Macerate 1 Gm. of unbroken cochineal [*Coccus*, U. S. P.], during four days, with 20 Cc. of alcohol and 60 Cc. of water. Then filter. The color of this test solution is turned *violet* by alkalies, and *yellowish-red* by acids. Cochineal T.S. is useful in titrating alkaloids, inorganic acids, ammonia, the alkalies, and alkaline earths. The presence of salts of iron, alumina, or copper should be avoided. This indicator is useless for titrating organic acids.

127. Hematoxylin Test Solution.—Dissolve 0.2 Gm. of hematoxylin [a crystalline substance derived from *Hæmatoxylon*, U. S. P.] in 100 Cc. of alcohol. Use about 5 drops for each titration. This indicator assumes a *yellow* to *orange* color in acid solutions, and a *violet* to *purple* color in alkaline solutions. The titration is complete when the change in color remains permanent upon the addition of one drop of the volumetric solution after stirring the liquid.

128. Iodeosin Test Solution.—Dissolve 0.1 Gm. of iodeosin, $C_{20}H_8I_4O_5$ (*tetraiodofluorescein*), in 100 Cc. of alcohol. This indicator becomes *colorless* in acid solutions, changing to *pink* in alkaline solutions. Dilute the solution to be titrated in a 200 Cc. flask with distilled water to about 100 Cc., add 20 Cc. of ether and 5 drops of the iodeosin T.S., cork, and shake well. Then add the volumetric alkali solution gradually, shaking well after each addition. The titration is complete when the lower aqueous solution retains a faint *pink* color after shaking thoroughly. For assaying alkaloidal residues, dissolve the latter in a measured excess of volumetric acid solution, and transfer the acid solution to a 200 Cc. flask, washing the container well with water until the contents of the flask measure about 100 Cc. Then proceed as above.

129. Litmus Paper and Test Solution.—Exhaust powdered litmus with three separate and successive portions (representing about 4 times its weight) of boiling alcohol (which removes the undesirable color erythrolitmin), each extraction lasting for about one hour. After draining off the alcohol, digest the residue with about an equal weight of cold water and filter. (This blue solution, which contains some alkali, after being acidulated, may be used to make red litmus paper.) Finally, extract the residue with about 5 times its weight of boiling water, and, after thoroughly cooling, filter. The addition of 1 drop of tenth-normal acid or alkali V.S. to 50 Cc. of water containing 5 drops of the indicator should produce a distinct change in color. Preserve the filtrate, as *test solution*, in wide-mouthed bottles stoppered with loose plugs of cotton so as to exclude dust but admit air. The blue color of litmus test solution is changed by acids to *red*, and this red color by the addition of alkalies is restored to *blue*.

Litmus Paper, Blue.—Impregnate with the test solution just described strips of white, unsized paper, free from wood-pulp, but not too porous, and dry them by suspending them on lines of clean twine, in an atmosphere free from acid or ammoniacal vapors.

Litmus Paper, Red.—Prepare this with the same kind of paper and in the same manner as described in the preceding paragraph. Add to the test solution used to impregnate the paper just sufficient of a highly diluted solution of hydrochloric acid to impart to it a faint red tint.

Neither blue nor red litmus paper should have a very intense color.

Preserve the test-paper in bottles, so as to exclude dust and acid or ammoniacal vapors.

130. Methyl-Orange Test Solution.—Dissolve 1 Gm. of methyl-orange, $NaC_{14}H_{14}N_3SO_3$ (the sodium or ammonium salt of dimethyl-amidoazobenzene sulphonic acid; also known as helianthin, tropæolin D, or Poirrier's Orange 3 P), in 1000 Cc. of water. Add to it, carefully, with constant stirring, tenth-normal sulphuric acid V.S., in drops, until the liquid turns red and just ceases to be transparent. Then filter.

To distinguish methyl-orange from other orange colors of this class, which are unfit for use as indicators, it should respond to the following tests:

Methyl-orange should be completely soluble in distilled water, and the test solution should be of an orange-yellow color, free from a brownish tint. No precipitate should form in this solution upon the addition of an alkali.

The addition of hydrochloric acid to a hot, concentrated solution of methyl-orange should produce a crystalline precipitate, composed of lustrous plates having a violet reflection and free from brown tint.

The addition of calcium chloride or barium chloride T.S. should produce no precipitate.

A few drops of gold chloride T.S. should produce a red coloration, free from either a violet or green tint.

Excessive quantities of this indicator should be avoided in titrating; from 1 to 3 drops are sufficient for a volume of from 50 to 100 Cc., or just enough is added to impart a faint tint to the solution, which if neutral should change to a red or yellow respectively upon the addition of 2 drops of a tenth-normal acid or alkali V.S.

Methyl-orange is suitable for titrating inorganic acids, alkalies, alkali carbonates or bicarbonates, also certain alkaloids, as morphine and quinine. It is not to be employed in titrating organic acids, nor in alcoholic or boiling solutions.

This indicator gives a *yellow* color with alkalies and *red* with acids.

131. Phenolphthalein Test Solution.—Dissolve 1 Gm. of phenolphthalein ($C_{20}H_{14}O_4$) in 50 Cc. of alcohol and dilute to 100 Cc. with water. About 3 drops are sufficient for 50 Cc. of the solution to be titrated; it gives a *red* color with alkali hydroxides or carbonates, while acids render the solution *colorless*. Phenolphthalein may be employed in hot titrations. It is not suitable as an indicator for ammonia, but is largely used for organic acids, alkali hydroxides, and for carbonates and bicarbonates in boiling solutions.

Phenolphthalein Paper is prepared by impregnating white, unsized paper with the test solution and drying it.

131 a. Rosolic Acid Test Solution.—Dissolve 1 Gm. of commercial rosolic acid (chiefly methylaurin, $C_{20}H_{16}O_3$) in 10 Cc. of diluted alcohol, and add enough water to make 100 Cc. Of this solution, about 0.5 Cc. is used for 100 Cc. of solution to be titrated. Ammoniacal solutions should be highly diluted when titrated with this indicator. In place of rosolic acid, commercial pæonin (aurin R) may be employed. This indicator gives a yellow color with acids and violet-red with alkalies.

132. Turmeric Tincture.—Digest any convenient quantity of ground turmeric root (from *Curcuma longa* Linné, Fam. *Zingiberaceæ*) repeatedly with small quantities of water and discard the liquids. Then digest the dried residue for several days with six times its weight of alcohol, and filter.

Turmeric Paper.—Impregnate white, unsized paper with the tincture, and dry it. The tincture, as well as the paper, turns *brown* with alkalies, and the original *yellow* color is restored by acids, with the exception of boric acid, which, even in the presence of hydrochloric acid, turns the color to reddish-brown, and this is changed to bluish-black by ammonia.

Volumetric Solutions

NOTE.—It is absolutely necessary that the measuring vessels employed in the operations of volumetric analysis, consisting of burettes, flasks, mixing cylinders, pipettes, etc., should agree among themselves accurately in their graduation at the standard temperature selected. It is immaterial what standard temperature has been selected for the graduation of the vessels.

All volumetric solutions must be prepared at the standard temperature of 25° C. (77° F.), and the solutions must be used in the titrations at a temperature not below 21° C. (69.8° F.), nor above 29° C. (84.2° F.).

All bottles in which volumetric solutions are to be kept, as well as the burettes or pipettes in which they are to be measured, should, prior to use, be thoroughly rinsed with distilled water, then with two or three small portions of the solution that they are to contain. When not in use, burettes should be kept filled with distilled water.

Normal volumetric solutions $\left(\frac{N}{1}\right)$ are those which contain in one liter, in any stated reaction, the chemical equivalent of one gramme of hydrogen. If the molecule of the reagent is univalent, one liter will contain the weight in grammes equal to the molecular weight of the reagent; if bivalent, a weight in grammes equal to one-half its molecular weight; if trivalent, a weight in grammes equal to one-third its molecular weight.

Thus, hydrochloric acid, $HCl = 36.18$, having but one H atom replaceable by a basic element, has 36.18 Gm. of absolute HCl in 1000 Cc. of the normal volumetric solution; while sulphuric acid, $H_2SO_4 = 97.35$, having two replaceable H atoms, contains only one-half this number, or 48.675 grammes of absolute H_2SO_4 in 1000 Cc. of its normal solution. Potassium hydroxide, $KOH = 55.74$, has but one K to replace one H in acids, hence its normal solution contains 55.74 grammes of pure KOH in one liter. Again, one molecule of potassium dichromate in oxidation liberates *three* atoms of oxygen which are capable of oxidizing *six* atoms of ferrous to ferric iron. Therefore, each molecule of the dichromate, yielding *three* atoms of oxygen, is equivalent to *six* atoms of hydrogen. Hence, the normal solution should contain $\frac{292.28}{6}$ or 48.713 Gm. in 1000 Cc. Two molecules of potassium permanganate, $2KMnO_4 = 313.96$, in oxidation, give off five atoms of O, which are equivalent to ten atoms of H; hence its normal solution should contain $\frac{313.96}{10}$ or 31.396 Gm. in 1000 Cc.

Solutions containing in 1000 Cc. one-tenth of the quantity of the active reagent in the normal solution are called tenth-normal $\left(\frac{N}{10}\right)$; those containing one-hundredth, hundredth-normal $\left(\frac{N}{100}\right)$; one-fiftieth, fiftieth-normal $\left(\frac{N}{50}\right)$; those containing twice the amount, double-normal $\left(\frac{2N}{1}\right)$; half the amount, half-normal $\left(\frac{N}{2}\right)$.

Solutions containing quantities of the active reagent and which have *no* simple relation to the molecular weight are called empirical.

Use of Empirical Solutions.—All standard volumetric solutio deteriorate in time, some very slowly, others rapidly, especially whe not properly preserved. To restore the titer of such solutions, th is, to make them exactly normal, tenth-, or hundredth-normal, as th case may be, each time they are to be used, involves an unnecessar waste of time. If one accurately standardized solution be alway available, it is not necessary that the other volumetric solutions employed in conjunction with it be diluted to exactly correspond, C for Cc., so long as the exact ratio is known.

The percentage strength of any empirical solution as compared wit a standard volumetric solution is ascertained by experiment, the the number of Cc. of the empirical solution consumed in the titratio of the substance is multiplied by its percentage strength, which resul represents the equivalent volume of the true standard solution.

Example.—One gramme of a sample of potassium carbonate require for neutralization 22 Cc. of an empirical solution of hydrochloric acid In a trial experiment, 16 Cc. of this weak solution were required t neutralize 10 Cc. of a standard normal potassium hydroxide V.S. The former is therefore of 62.5 percent. strength (for 16 : 10 = 100 : x. x = 62.5), hence the 22 Cc. of empirical solution consumed represent 13.75 Cc. (62.5 percent. of 22) of standard normal hydrochloric acid V.S. Then if 1 Cc. of $\frac{N}{1}$ hydrochloric acid V.S. = 0.06863 Gm. of potassium carbonate, 13.75 Cc. would be equivalent to 13.75 × 0.06863, or 0.9436+ Gm. of carbonate.

128. Alkaline Cupric Tartrate Volumetric Solution

[Fehling's Solution]

A. The Copper Solution.—Dissolve 34.64 (34.6063) Gm. of carefully selected, small crystals of pure cupric sulphate [*Cupri Sulphas*, U. S. P.], showing no trace of efflorescence or of adhering moisture, in a sufficient quantity of water to make the solution measure, at 25° C. (77° F.), exactly 500 Cc.

Keep this solution in small, well-stoppered bottles.

B. The Alkaline Tartrate Solution.—Dissolve 173 Gm. of crystallized potassium and sodium tartrate [*Potassii et Sodii Tartras*, U. S. P.], and 70 Gm. of potassium hydroxide [*Potassii Hydroxidum*, U. S. P.], in a sufficient quantity of water to make the solution measure, at 25° C. (77° F.), exactly 500 Cc.

Keep the solution in small, rubber-stoppered bottles.

For use, mix exactly equal volumes of the two solutions at the time required.

One Cubic Centimeter of the mixed solution is the equivalent of:

	Gramme.
Cupric Sulphate, crystallized, $CuSO_4 + 5H_2O$	0.03467
Cupric Tartrate, $CuC_4H_4O_6 + 3H_2O$	0.03688
Cane Sugar (Inverted)	0.00475
Glucose, anhydrous, $C_6H_{12}O_6$	0.00500
Milk Sugar, anhydrous, $C_{12}H_{22}O_{11}$	0.00678

134. Tenth-Normal Bromine Volumetric Solution

[KOPPESCHAAR'S SOLUTION]

Br = 79.36. 7.936 Gm. in 1000 Cc.

Dissolve 3.2 Gm. of potassium bromate (No. 81) and 50 Gm. of potassium bromide in sufficient water to measure, at or near 25° C. (77° F.), 900 Cc. Transfer 20 Cc. of this solution, by means of a pipette, into a bottle having a capacity of about 250 Cc., and provided with a glass stopper; add 75 Cc. of water and 5 Cc. of pure hydrochloric acid, and immediately insert the stopper. Shake the bottle a few times, then remove the stopper just sufficiently to quickly introduce 5 Cc. of potassium iodide T.S., taking care that no bromine vapors escape, and immediately stopper the bottle. Agitate the bottle thoroughly, remove the stopper and rinse it and the neck of the bottle with a little water so that the washings flow into the bottle, and then add from a burette tenth-normal sodium thiosulphate V.S. until the brown iodine tint is just discharged. Note the number of Cc. of the sodium thiosulphate V.S. thus consumed, and then dilute the bromine solution so that equal volumes of it and of tenth-normal sodium thiosulphate V.S. will exactly correspond to each other under the conditions mentioned above.

EXAMPLE.—Assuming that the 20 Cc. of the bromine solution have required 25.2 Cc. of the sodium thiosulphate V.S. to completely discharge the iodine tint, then each 20 Cc. of the bromine solution must be diluted to 25.2 Cc. Thus, if 850 Cc. of the solution remain, it must be diluted with water to measure 1071 Cc.

After the solution is thus diluted, a new trial should be made in the manner above described, in which 25 Cc. of the tenth-normal sodium thiosulphate V.S. should just discharge the tint of the iodine liberated by the bromine set free from 25 Cc. of the standard bromine solution.

Keep the solution in dark amber-colored, glass-stoppered bottles.

One Cubic Centimeter of Tenth-Normal Bromine V. S. is the equivalent of:

	Gramme.
Bromine, Br	0.007936
Phenol, C_6H_5OH	0.001556

135. Normal Hydrochloric Acid Volumetric Solution

HCl = 36.18. 36.18 Gm. in 1000 Cc.

Mix 130 Cc. of hydrochloric acid of specific gravity 1.158 with sufficient water to measure 1000 Cc.

Of this liquid (which is still too concentrated) carefully measure, from a burette, 10 Cc. into a flask or porcelain dish, and after diluting with about double its volume of water, add 2 drops of methyl-orange T.S., then gradually add, from a burette, a *freshly standardized* normal potassium hydroxide V.S., until the red tint of the solution changes, after vigorous shaking, to a permanent pale yellow. Note the number of Cc. of potassium hydroxide V.S. consumed, and then dilute the acid solution so that equal volumes of this and of the normal potassium hydroxide V.S. neutralize each other at 25° C. (77° F.).

EXAMPLE.—Assuming that 10 Cc. of the acid solution first prepared required exactly 11 Cc. of normal potassium hydroxide V.S., each 10 Cc. of the former must be diluted to 11 Cc., or the whole of the remaining acid solution in the same proportion at 25° C. (77° F.). Thus, if 950 Cc. should remain, 95 Cc. of water must be added.

After the liquid is thus diluted, a new trial should be made in the manner above described, in which 50 Cc. of the acid solution should require for neutralization exactly 50 Cc. of normal potassium hydroxide V.S. If necessary, a new adjustment should then be made to render the correspondence perfect at 25° C. (77° F.).

One Cubic Centimeter of Normal Hydrochloric Acid V.S. is the equivalent of:

	Gramme.
Hydrochloric Acid, absolute, HCl	0.03618

NOTE.—Normal hydrochloric acid is in every respect equivalent in neutralizing power to normal sulphuric acid (see No. 152), and may be employed, except in special cases, for the same purposes. However, preference is generally given to the normal sulphuric acid V.S.

136. Half-Normal Hydrochloric Acid Volumetric Solution

HCl = 36.18. 18.09 Gm. in 1000 Cc.

Dilute 500 Cc. of normal hydrochloric acid V.S. with sufficient [illegible] to measure exactly 1000 Cc. at 25° C. (77° F.).

One Cubic Centimeter of Half-Normal Hydrochloric Acid V. S. is the equivalent of:

	Gramme.
Hydrochloric Acid, absolute, HCl	0.01809
Benzaldehyde, C_7H_6O	0.0526
Cinnamic Aldehyde, C_9H_8O	0.0333
Citral, $C_{10}H_{16}O$	0.03802
Potassium Acetate, $KC_2H_3O_2$ (after ignition)	0.04872
Potassium Bicarbonate, $KHCO_3$	0.049705
Potassium Bitartrate, $KHC_4H_4O_6$ (after ignition)	0.09339
Potassium Carbonate, anhydrous, K_2CO_3	0.034318
Potassium Citrate, cryst., $K_3C_6H_5O_7 + H_2O$ (after ignition)	0.05368
Potassium Hydroxide, KOH	0.02787
Potassium and Sodium Tartrate, $KNaC_4H_4O_6 + 4H_2O$ (after ignition)	0.070045
Sodium Acetate, $NaC_2H_3O_2 + 3H_2O$ (after ignition)	0.06755
Sodium Benzoate, $NaC_7H_5O_2$ (after ignition)	0.071505
Sodium Bicarbonate, $NaHCO_3$	0.041715
Sodium Carbonate, anhydrous, Na_2CO_3	0.026328
Sodium Carbonate, monohydrated, $Na_2CO_3 + H_2O$	0.030798
Sodium Citrate, $2Na_3C_6H_5O_7 + 11H_2O$ (after ignition)	0.0591
Sodium Hydroxide, NaOH	0.01988
Sodium Salicylate, $NaC_7H_5O_3$ (after ignition)	0.079445

137. Tenth-Normal Iodine Volumetric Solution

I = 125.9. 12.59 Gm. in 1000 Cc.

Tenth-normal iodine V. S. may be prepared according to either of the following methods.

I. Dissolve 12.59 Gm. of pure iodine (see below) in a solution of 18 Gm. of potassium iodide in 300 Cc. of water. Then add sufficient water to make the solution measure, at 25° C. (77° F.), exactly 1000 Cc. Unless freshly prepared, its strength should always be determined anew at the time it is used. Transfer the solution to glass-stoppered vials.

Preparation of Pure Iodine.—Heat powdered iodine [*Iodum*, U. S. P.] in a porcelain dish placed over a bath of boiling water for twenty minutes, and stir it constantly with a glass rod, so that adhering moisture, cyanogen iodide, and most of the iodine bromide and iodine chloride, if present, may be vaporized. Then transfer the iodine to a porcelain or other non-metallic mortar, and triturate it with about 5 percent. of its weight of dry potassium iodide, so as to decompose any remaining iodine bromide and iodine chloride. Then return the mass to the dish, cover it with a glass funnel, and heat the dish carefully on a sand-bath. Detach the sublimed, pure iodine, and, after pulverizing and drying for twenty-four hours over calcium chloride, keep it in well-stoppered bottles, in a cool place.

II. Tenth-normal iodine V.S. may also be prepared as follows:

Dissolve about 14 Gm. of iodine [*Iodum*, U. S. P.] in a solution of 18 Gm. of potassium iodide [*Potassii Iodidum*, U. S. P.] in about 300 Cc. of water, diluting finally to 1000 Cc. Of this solution (which is too concentrated), carefully measure from a burette 10 Cc. into a flask, then add gradually and cautiously, from a burette, tenth-normal sodium thiosulphate V.S. (shaking constantly) until the color of the solution is discharged. Note the number of Cc. of the sodium thiosulphate V.S. consumed, and then dilute the iodine solution so that any known volume of the latter will require for decolorization exactly the same volume of the tenth-normal sodium thiosulphate V.S.

EXAMPLE.—Assuming that 10 Cc. of the iodine solution required 10.8 Cc. of the tenth-normal sodium thiosulphate V.S. for decolorization, then each 10 Cc. of the former must be diluted to 10.8 Cc., or each 100 Cc. of the iodine solution to 108 Cc. at 25° C. (77° F.). After the solution is thus diluted, a new trial should be made in the manner above described, in which 50 Cc. of the tenth-normal iodine V.S. should require exactly 50 Cc. of the tenth-normal sodium thiosulphate V.S. for complete decolorization. If necessary, a new adjustment should be made to render the correspondence perfect.

One Cubic Centimeter of Tenth-Normal Iodine V.S. is the equivalent of:

	Gramme.
Iodine, I	0.01259
Arsenic, As	0.00372
Arsenic Trioxide (Arsenous acid), As_2O_3	0.004911
Iron, Fe	0.002775
Potassium Sulphite, crystallized, $K_2SO_3 + 2H_2O$	0.009648
Sodium Bisulphite, $NaHSO_3$	0.005168
Sodium Thiosulphate (Hyposulphite), crystals, $Na_2S_2O_3 + 5H_2O$	0.024646
Sodium Sulphite, crystallized, $Na_2SO_3 + 7H_2O$	0.012520
Sulphur Dioxide, SO_2	0.003180
Antimony and Potassium Tartrate, crystallized, $2K(SbO)C_4H_4O_6 + H_2O$	0.016495

138. Tenth-Normal Oxalic Acid Volumetric Solution

$H_2C_2O_4 + 2H_2O = 125.10.$ 6.255 Gm. in 1000 Cc.

Dissolve 6.4 Gm. of pure oxalic acid (see No. 73) in sufficient water to measure 1000 Cc.

Into a flask, accurately measure, from a burette, 10 Cc. of a *freshly standardized* tenth-normal potassium hydroxide V.S., dilute with about 20 Cc. of water, add 3 to 5 drops of phenolphthalein T.S. and heat to boiling. From a burette gradually add the oxalic acid solution (which is still too concentrated) until the red tint of the alkali solution fails to reappear after vigorous shaking and boiling. Note the number of Cc. of the oxalic acid solution consumed, and then dilute it so that equal volumes of this and of the tenth-normal potassium hydroxide V.S. neutralize each other at 25° C. (77° F.). It deteriorates on standing.

EXAMPLE.—Assuming that the 10 Cc. of the tenth-normal potassium hydroxide V.S. required exactly 9.5 Cc. of the oxalic acid solution, then each 9.5 Cc. of the latter must be diluted to 10 Cc., or the whole of the remaining acid solution in the same proportion at 25° C. (77° F.). Thus, if 950 Cc. of the oxalic acid solution should remain, 50 Cc. of water must be added.

After the liquid is thus diluted, a new trial should be made in the manner above described, in which 50 Cc. of tenth-normal potassium hydroxide V.S. should require for neutralization exactly 50 Cc. of the oxalic acid solution at 25° C. (77° F.). If necessary, a new adjustment should then be made to render the correspondence perfect.

NOTE.—Tenth-normal oxalic acid V.S. is in every respect equivalent in neutralizing power to any other tenth-normal acid V.S. with either litmus or phenolphthalein T S. as indicator. Its most important use is in standardizing tenth-normal potassium permanganate V.S.

One Cubic Centimeter of Tenth-Normal Oxalic Acid V.S. is the equivalent of:

	Gramme.
Oxalic Acid, crystallized, $H_2C_2O_4 + 2H_2O$	0.006255
Ammonia Gas, NH_3	0.001693
Calcium Hydroxide, $Ca(OH)_2$	0.003678
Lead Subacetate, $Pb_2O(C_2H_3O_2)_2$	0.0135935
Manganese Dioxide, precipitated, MnO_2	0.004318
Potassium Hydroxide, KOH	0.005574
Potassium Permanganate, $KMnO_4$	0.0031396
Sodium Hydroxide, NaOH	0.003976

139. Tenth-Normal Potassium Dichromate Volumetric Solution

$K_2Cr_2O_7 = 292.28$. 4.8713 Gm. in 1000 Cc.

Dissolve 4.8713 Gm. of pure potassium dichromate, which has been pulverized and dried at 120° C. (248° F.) (see Reagent No. 85), in sufficient water to measure, at 25° C. (77° F.), exactly 1000 Cc.

When used with phenolphthalein as indicator, to neutralize alkalies, the volumetric solution of potassium dichromate is tenth-normal when it contains 14.614 Gm. in 1000 Cc. It is then the exact equivalent of any tenth-normal acid V.S., each Cc. being equivalent to the amounts of alkalies quoted under such acids.

When used as an oxidizing agent to convert ferrous into ferric salts, or to liberate iodine from potassium iodide, the solution just mentioned containing 14.614 Gm. in 1000 Cc. has the effect of a $\frac{3N}{10}$ volumetric solution, and a solution of one-third of this strength, containing 4.8713 Gm. in 1000 Cc., has the value of a tenth-normal solution, and is the equivalent of an equal volume of tenth-normal potassium permanganate V.S., or, in the case of iodine liberated from potassium iodide, it is the equivalent of an equal volume of tenth-normal sodium thiosulphate V.S. For titrating iron in ferrous compounds, it is used in the following manner. Introduce the aqueous solution of the ferrous salt into a flask and, if it is not already acid, render it so with sulphuric acid. Now add, gradually, tenth-normal potassium dichromate V.S. from a burette, with agitation, until a drop taken out upon a white surface no longer becomes blue when mixed with a drop of freshly prepared potassium ferricyanide T.S.

Tenth-normal potassium dichromate V.S. may also be used, in conjunction with potassium iodide (from which it liberates iodine) and sulphuric acid, for adjusting the titer of sodium thiosulphate V.S. and thus that of the iodine V.S.

One Cubic Centimeter of Tenth-Normal Potassium Dichromate V.S. is the equivalent of:

	Gramme
Potassium Dichromate, $K_2Cr_2O_7$	0.0048713
Iron, Fe, in ferrous compounds	0.00555
Ferrous Carbonate, $FeCO_3$	0.011503
Ferrous Sulphate, anhydrous, $FeSO_4$	0.015085
Ferrous Sulphate, crystallized, $FeSO_4 + 7H_2O$	0.027601
Ferrous Sulphate, dried, $2FeSO_4 + 3H_2O$	0.017767
Sodium Thiosulphate, $Na_2S_2O_3 + 5H_2O$	0.024646

140. Normal Potassium Hydroxide Volumetric Solution

$KOH = 55.74.$ 55.74 Gm. in 1000 Cc.

Dissolve 75 Gm. of potassium hydroxide [*Potassii Hydroxidum*, U. S. P.], in sufficient water to measure about 1050 Cc., and fill a burette with a portion of this liquid.

Into a flask of the capacity of about 200 Cc., introduce 9.339 Gm. of potassium bitartrate, which has been purified and dried as directed under No. 80, and 160 Cc. of distilled water. Boil the liquid until solution has taken place, add from 3 to 5 drops of phenolphthalein T.S., followed by the cautious addition, from a burette, of the potassium hydroxide solution, frequently agitating the flask, boiling, and, toward the end of the operation, reducing the flow to drops until the red color produced by its influx no longer disappears on shaking, but is not deeper than pale pink. Note the number of Cc. of the potassium hydroxide solution consumed, and then dilute the remainder of the solution so that exactly 50 Cc. of the diluted liquid at 25° C. (77° F.) shall be required to neutralize the 9.339 Gm. of potassium bitartrate used.

EXAMPLE.—Assuming that 40 Cc. of the stronger solution of potassium hydroxide first prepared had been consumed in the trial, then each 40 Cc. must be diluted to 50 Cc., or the whole of the remaining solution in the same proportion at 25° C. (77° F.). Thus, if 1000 Cc. should be still remaining, this must be diluted with water to 1250 Cc.

After the liquid is thus diluted, a new trial should be made in the manner above described, in which 50 Cc. of the diluted solution should exactly neutralize 9.339 Gm. of potassium bitartrate at 25° C. (77° F.). If necessary, a new adjustment should then be made to render the correspondence perfect.

NOTE.—Solutions of caustic alkalies absorb carbon dioxide from the atmosphere, and thereby change their titer when used with litmus T.S., or phenolphthalein T.S., as indicator (methyl-orange T.S. is not affected by the presence of carbonic acid). Hence the volumetric solutions should be preserved in bottles provided with well-fitting rubber stoppers, or, better still, these should be provided with tubes filled with soda-lime (a mixture of caustic soda and lime); the tubes pass through a perforation in the rubber stoppers, and thus absorb the carbon dioxide and prevent its access to the solution. If the solution is kept in a burette for any length of time, the same provision with a soda-lime tube should be observed.

In place of potassium hydroxide V.S., sodium hydroxide V.S. (see No. 150) may be used, in the same manner and in the same quantity. Potassium hydroxide V.S., however, is preferable, since it foams less, and attacks glass more slowly.

One Cubic Centimeter of Normal Potassium Hydroxide V.S. is the equivalent of:

	Gramme.
Potassium Hydroxide, KOH	0.05574
Acetic Acid, absolute, $HC_2H_3O_2$	0.05958
Ammonia Gas, NH_3	0.01693
Ammonium Chloride, NH_4Cl	0.05311

	Gramme.
Boric Acid, H_3BO_3	0.06154
Citric Acid, crystallized, $H_3C_6H_5O_7 + H_2O$	0.06950
Hydriodic Acid, absolute, HI	0.12690
Hydrobromic Acid, absolute, HBr	0.08036
Hydrochloric Acid, absolute, HCl	0.03618
Hypophosphorous Acid, HPH_2O_2	0.06553
Lactic Acid, absolute, $HC_3H_5O_3$	0.08937
Nitric Acid, absolute, HNO_3	0.06257
Oxalic Acid, crystallized, $H_2C_2O_4 + 2H_2O$	0.06255
Phosphoric Acid, H_3PO_4 (to form K_2HPO_4; with phenolphthalein)	0.048645
Potassium Dichromate, $K_2Cr_2O_7$	0.14614
Sodium Hydroxide, NaOH	0.03976
Sulphuric Acid, absolute, H_2SO_4	0.048675
Tartaric Acid, crystallized, $H_2C_4H_4O_6$	0.07446
Trichloracetic Acid, CCl_3COOH	0.16212

141. Tenth-Normal Potassium Hydroxide Volumetric Solution

KOH = 55.74. 5.574 Gm. in 1000 Cc.

Dilute 100 Cc. of freshly standardized normal potassium hydroxide V.S. with sufficient distilled water to measure, at 25° C. (77° F.), exactly 1000 Cc.

This solution may also be prepared and standardized directly with potassium bitartrate, as directed under normal potassium hydroxide V.S., employing for this purpose 0.9339 Gm. of the former and a solution of about 7.5 Gm. of potassium hydroxide [*Potassii Hydroxidum*, U. S. P.] in 1000 Cc. of distilled water. Fifty Cc. of the prepared tenth-normal solution at 25° C. (77° F.) should exactly neutralize 0.9339 Gm. of potassium bitartrate (No. 80).

NOTE.—The same precautions should be taken for protecting this solution from carbon dioxide of the air as are directed under normal potassium hydroxide V.S.

One Cubic Centimeter of Tenth-Normal Potassium Hydroxide V.S. is the equivalent of:

	Gramme.
Potassium Hydroxide, KOH	0.005574
Sulphuric Acid, absolute, H_2SO_4	0.0048675

142. Fiftieth-Normal Potassium Hydroxide Volumetric Solution

KOH = 55.74. 1.1148 Gm. in 1000 Cc.

Dilute 20 Cc. of a freshly standardized normal or 200 Cc. of tenth-normal potassium hydroxide V.S. with sufficient distilled water to measure, at 25° C. (77° F.), exactly 1000 Cc. This standard solution is employed in conjunction with the tenth-normal sulphuric acid V.S. in the titration of alkaloids, with hematoxylin, cochineal, or iodeosin T.S. as indicators.

NOTE.—The same precautions should be taken for protecting this solution from carbon dioxide of the air as are directed under normal potassium hydroxide V.S. It should be renewed at frequent intervals.

One Cubic Centimeter of Fiftieth-Normal Potassium Hydroxide V.S. is the equivalent of:

	Gramme.
Potassium Hydroxide, KOH	0.0011148
Sulphuric Acid, absolute, H_2SO_4	0.0009735
Aconitine, $C_{34}H_{47}NO_{11}$	0.012811
Atropine, $C_{17}H_{23}NO_3$	0.005741
Cinchonidine, $C_{19}H_{22}N_2O$	0.005841
Cinchonine, $C_{19}H_{22}N_2O$	0.005841
Combined Alkaloids of Cinchona bark	0.006139
Combined Alkaloids of Ipecac	0.004768
Cocaine, $C_{17}H_{21}NO_4$	0.006018
Coniine, $C_8H_{17}N$	0.002524
Hydrastine, $C_{21}H_{21}NO_6$	0.007606
Morphine, crystallized, $C_{17}H_{19}NO_3 + H_2O$	0.006018
Morphine, anhydrous, $C_{17}H_{19}NO_3$	0.005661
Physostigmine, $C_{15}H_{21}N_3O_2$	0.005464
Pilocarpine, $C_{11}H_{16}N_2O_2$	0.004133
Quinine, $C_{20}H_{24}N_2O_2$	0.006436
Strychnine, $C_{21}H_{22}N_2O_2$	0.006635

143. Hundredth-Normal Potassium Hydroxide Volumetric Solution

KOH = 55.74. 0.5574 Gm. in 1000 Cc.

Dilute 10 Cc. of normal or 100 Cc. of tenth-normal potassium hydroxide V.S. with sufficient water to measure, at 25° C. (77° F.), exactly 1000 Cc. The solution must be frequently renewed.

One Cubic Centimeter of Hundredth-Normal Potassium Hydroxide V.S. is the equivalent of:

	Gramme.
Potassium Hydroxide, KOH	0.0005574
Sulphuric Acid, absolute, H_2SO_4	0.00048675

144. Half-Normal Alcoholic Potassium Hydroxide Volumetric Solution.

$KOH = 55.74$. 27.87 Gm. in 1000 Cc.

Dissolve about 40 Gm. of potassium hydroxide [*Potassii Hydroxidum*, U. S. P.], which has been broken into small pieces, in about 20 Cc. of water, and add sufficient alcohol [*Alcohol*, U. S. P.], to measure 1000 Cc. After setting aside in a well-stoppered bottle for one day, the clear supernatant solution should be quickly decanted into a bottle provided with a well-fitted rubber stopper.

Into a flask of the capacity of about 300 Cc., introduce 1.8678 Gm. of potassium bitartrate, which has been purified and dried, as directed under No. 80, and about 100 Cc. of distilled water. Heat the solution to the boiling point, add 5 drops of phenolphthalein T. S., followed by the cautious addition, from a burette, of the potassium hydroxide solution, frequently agitating the flask, boiling, and, toward the end of the operation, reducing the flow to drops until the red color produced by its influx no longer disappears on shaking, but is not deeper than pale pink. Note the number of Cc. of the alcoholic potassium hydroxide solution consumed, and then dilute the remainder of the solution with alcohol so that exactiy 20 Cc. of the diluted liquid shall be required to neutralize the 1.8678 Gm. of potassium bitartrate used.

EXAMPLE.—Assuming that 12.5 Cc. of the stronger alcoholic solution of potassium hydroxide first prepared had been consumed in the trial, then each 12.5 Cc. must be diluted with alcohol to 20 Cc., or the whole of the remaining solution in the same proportion at 25° C. (77° F.). Thus, if 980 Cc. should remain, this must be diluted with alcohol to measure 1568 Cc.

Half-Normal Alcoholic Potassium Hydroxide V. S. may also be prepared as follows: Of the above described concentrated alcoholic potassium hydroxide solution, carefully measure, from a burette, 20 Cc. into a flask, and, after diluting with about 50 Cc. of water, add about 5 drops of phenolphthalein T. S., heat to a boiling temperature, and add, from a burette, half-normal hydrochloric acid V. S., frequently agitating the flask, and, toward the end of the operation, reducing the flow to drops until the red color is just discharged. Note the number of Cc. of the half-normal hydrochloric acid V. S. consumed, and then dilute the remainder of the solution with alcohol so that equal volumes of this and of the half-normal hydrochloric acid V. S. neutralize each other at 25° C. (77° F.).

Should half-normal hydrochloric acid V. S. not be available, standardization can be carried out in the same manner with *normal* hydrochloric acid V. S., two volumes of the alcoholic potassium hydroxide being made to correspond with one volume of the standard acid.

NOTE.—This solution should be kept in bottles provided with a well-fitted rubber stopper and protected from the light. Owing to the readiness with which this standard solution loses its titer, blank tests should be performed whenever it is employed in titrations.

One Cubic Centimeter of Half-Normal Alcoholic Potassium Hydroxide V. S. is the eqvivalent of:

	Gramme.
Potassium Hydroxide, KOH	0.02787
Borneol, $C_{10}H_{18}O$	0.07649
Bornyl Acetate, $C_{10}H_{17}O.C_2H_3O$	0.09734
Menthol, $C_{10}H_{20}O$	0.07749
Menthyl Acetate, $C_{10}H_{19}O.C_2H_3O$	0.09834
Santalol, $C_{15}H_{26}O$	0.11026

145. Tenth-Normal Potassium Permanganate Volumetric Solution

$2KMnO_4 = 313.96$. 3.1396 Gm.* in 1000 Cc.

Introduce about 3.3 Gm. of pure, crystallized potassium permanganate [*Potassii Permanganas*, U. S. P.] into a flask, add 1000 Cc. of distilled water, and boil for about five minutes. Close the flask with a plug of absorbent cotton, and set aside for at least two days, so that suspended matter may deposit. After the lapse of this time, pour off the clear portion of the solution into a glass-stoppered bottle.

The water to be employed for diluting this solution (which is still too concentrated) should be prepared as directed under Distilled Water [*Aqua Destillata*, U. S. P.], adding however, about 1 Gm. of potassium permanganate to the water in the retort before beginning the distillation.

I. Introduce into a flask 10 Cc. of an accurately standardized tenth-normal oxalic acid V. S., add 1 Cc. of pure, concentrated sulphuric acid, and before this mixture cools gradually add, from a burette provided with a glass stop-cock, small quantities of the permanganate solution to be standardized, shaking the flask after each addition and reducing the flow to drops toward the end of the operation. When the last drop of the permanganate solution added is no longer decolorized but imparts a pinkish tint to the liquid, which remains permanent for one-half minute, note the number of Cc. consumed, and then dilute the trial permanganate solution with the specially prepared distilled water so that it will correspond, volume for volume, at 25° C. (77° F.), with the tenth-normal oxalic acid V.S. (note example under II.).

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* The exact quantity is never weighed, but the solution is adjusted directly by oxalic acid or indirectly with sodium thiosulphate.

II. Tenth-normal potassium permanganate V.S. may also be standardized as follows:

To a solution of about 1 Gm. of potassium iodide [*Potassii Iodidum*, U. S. P.], in 10 Cc. of diluted sulphuric acid, contained in a flask, add, from a burette provided with a glass stop-cock, 20 Cc. of the potassium permanganate solution to be standardized; then dilute the mixture at once with about 200 Cc. of distilled water. An accurately standardized tenth-normal sodium thiosulphate V.S. is then slowly added from a burette, while the mixture is vigorously shaken, until the color is discharged. Note the number of Cc. of the latter consumed, then dilute the permanganate solution so that equal volumes of the two solutions correspond to each other under the same conditions at 25° C. (77° F.).

EXAMPLE.—Assuming that 25 Cc. of the tenth-normal sodium thiosulphate V.S. were required to decolorize the liberated iodine of the mixture, then each 20 Cc. of the potassium permanganate solution must be diluted with the specially prepared distilled water to 25 Cc., or the whole of the remaining solution in the same proportion. Thus, if 920 Cc. remain, it should be diluted to measure 1150 Cc. at 25° C (77° F.).

After the potassium permanganate solution is thus diluted, a new trial should be made in the manner above described, in which 20 Cc. of this solution should require exactly 20 Cc. of the tenth-normal sodium thiosulphate V.S. to decolorize the mixture. If necessary, a new adjustment should be made to render the correspondence perfect.

NOTE.—When potassium permanganate V.S. is to be prepared for immediate use, this may be done as follows: Dissolve about 3.3 Gm. of pure, crystallized potassium permanganate in 1000 Cc. of recently boiled and cooled pure water. This is then standardized by either of the above methods and diluted accordingly with recently boiled and cooled pure water. Potassium permanganate V.S. made by this method without the preliminary boiling and standing deteriorates readily, hence should be verified each time it is used.

Potassium permanganate V.S. should be kept in well-closed glass-stoppered bottles, and only burettes provided with glass stop-cocks should be employed in titrating with it. Even when properly pre- and preserved, this solution should be restandardized frequently.

One Cubic Centimeter of Tenth-Normal Potassium Permanganate V.S. is the equivalent of:

	Gramme.
Potassium Permanganate, $KMnO_4$	0.0031396
Calcium Oxide, CaO (as oxalate)	0.002784
Iron, Fe, in ferrous compounds	0.005550
Ferrous Carbonate, $FeCO_3$	0.011505
Ferrous Oxide, FeO	0.007138
Ferrous Sulphate, anhydrous, $FeSO_4$	0.015085
Ferrous Sulphate, crystals, $FeSO_4 + 7H_2O$	0.027601
Ferrous Sulphate, dried, $2FeSO_4 + 3H_2O$	0.017767
Hydrogen Dioxide, H_2O_2	0.001688
Oxalic Acid, crystallized, $H_2C_2O_4 + 2H_2O$	0.006255
Oxygen, O	0.000794
Sodium Nitrite, $NaNO_2$	0.0034285

146. Tenth-Normal Potassium Sulphocyanate Volumetric Solution

[VOLHARD'S SOLUTION]

KSCN = 96.53. 9.653 Gm. in 1000 Cc.

Dissolve 10 Gm. of crystals of pure potassium sulphocyanate (No. 96) in 1000 Cc. of water.

This solution is too concentrated, and has to be adjusted so as to correspond in strength exactly with tenth-normal silver nitrate V.S. For this purpose, introduce into a flask 10 Cc. of tenth-normal silver nitrate V.S., 3 Cc. of ferric ammonium sulphate T.S., and 3 Cc. of nitric acid (free from nitrous compounds), and dilute the liquid with about 100 Cc. of distilled water. To this mixture add, from a burette, in small portions at a time, the sulphocyanate solution. At first, a white precipitate of silver sulphocyanate appears, then, every drop falling from the burette is surrounded by a deep brownish-red color produced by ferric sulphocyanate, which disappears on vigorous shaking of the flask as long as any of the silver nitrate remains unchanged. When all the silver has been converted into sulphocyanate, a single additional drop of the potassium sulphocyanate solution produces a brownish-red color which no longer disappears on shaking, but communicates a perceptible pale reddish-brown tint to the contents of the flask. Note the number of Cc. of the potassium sulphocyanate solution used, and dilute the whole of the remaining solution so that equal volumes of this and of the tenth-normal silver nitrate V.S., at 25° C. (77° F.), will be required to produce the permanent reddish-brown tint. (The same depth of pale reddish-brown tint to which the volumetric solution is adjusted must be attained when the solution is used for volumetric assays.)

After the dilution, a new trial should be made, in which 50 Cc. of tenth-normal silver nitrate V.S., 5 Cc. of ferric ammonium sulphate T.S., 5 Cc. of nitric acid, and 200 Cc. of water are used, and there should be required exactly 50 Cc. of the potassium sulphocyanate solution, at 25° C. (77° F.), to produce the same depth of a permanent pale reddish-brown tint.

If necessary, a new adjustment should be made, to render the correspondence perfect.

One Cubic Centimeter of Tenth-Normal Potassium Sulphocyanate V.S. is the equivalent of:

	Gramme.
Potassium Sulphocyanate, KSCN	0.009653
Silver, Ag	0.010712
Silver Nitrate, $AgNO_3$	0.016869

147. Tenth-Normal Silver Nitrate Volumetric Solution

$AgNO_3 = 168.69$. 16.869 Gm. in 1000 Cc.

Dissolve 16.869 Gm. of silver nitrate [*Argenti Nitras*, U. S. P.] which, previous to weighing, has been pulverized and dried in a covered porcelain crucible in an air-bath at 130° C. (266° F.) for one hour, in sufficient water to measure, at 25° C. (77° F.), exactly 1000 Cc.

Keep the solution in dark amber-colored, glass-stoppered vials, carefully protected from dust and sunlight.

NOTE.—Titration by tenth-normal silver nitrate V.S. may be conducted in various ways, adapted to the special preparation to be tested:

a. The titration of soluble chlorides and bromides.—To the solution of an accurately weighed quantity of the salt, contained in either a porcelain dish or a flask placed on a white surface, sufficient potassium chromate T.S. is added to impart a yellow tint, then the tenth-normal silver nitrate V.S. is slowly added from a burette, stirring or agitating constantly until the mixture acquires a permanent red tint, due to the formation of red silver chromate. This method is only suitable for *neutral* solutions.

b. The titration of free hydrobromic, hydrochloric, and hydriodic acids or their salts in acid solution, known as the Volhard or Thiocyanate (Sulphocyanate) method of residual titration.—An accurately measured excess of tenth-normal silver nitrate V.S. is added to the solution of the halogen acid or its salt, and then acidified with pure nitric acid, and the indicator (ferric ammonium sulphate T.S.) added; then the uncombined excess of the silver nitrate V.S. is determined by titrating back with tenth-normal potassium sulphocyanate V.S., the end-reaction being the formation of a permanent pale reddish-brown tint (due to ferric sulphocyanate). The volume of the silver nitrate V.S. originally added, less that of the potassium sulphocyanate V.S. consumed, will give the number of Cc. of the former which were required for the precipitation of the halogen. The quantity of nitric acid added should be sufficient to remove the yellow color produced by the addition of the indicator.

c. Titration till the first appearance of a permanent precipitate.—This method is applicable in the estimation of the alkali cyanides and hydrocyanic acid. When the solution is used by this method it is fifth-normal instead of tenth-normal solution.

One Cubic Centimeter of Tenth-Normal Silver Nitrate V.S. is the equivalent of:

	Gramme.
Silver Nitrate, $AgNO_3$	0.016869
Allyl Iso-thiocyanate, $CS.NC_3H_5$	0.00492
Ammonium Bromide, NH_4Br	0.009729
Ammonium Chloride, NH_4Cl	0.005311
Ammonium Iodide, NH_4I	0.014383
Bromine, Br	0.007936
Calcium Bromide, $CaBr_2$	0.009926
Chlorine, Cl	0.003518
Ferrous Bromide, anhydrous, $FeBr_2$	0.010711
Ferrous Iodide, FeI_2	0.015365
Hydriodic Acid, HI	0.012690
Hydrobromic Acid, HBr	0.008036
Hydrochloric Acid, HCl	0.003618
Hydrocyanic Acid, HCN, to first formation of precipitate	0.005368
Hydrocyanic Acid, HCN, potassium chromate as indicator	0.002684
Iodine, I	0.012590
Lithium Bromide, LiBr	0.008634
Potassium Bromide, KBr	0.011822
Potassium Chloride, KCl	0.007404
Potassium Cyanide, KCN, to first formation of precipitate	0.012940
Potassium Iodide, KI	0.016476
Potassium Sulphocyanate, KSCN	0.009653
Sodium Bromide, NaBr	0.010224
Sodium Chloride, NaCl	0.005806
Sodium Iodide, NaI	0.014878
Strontium Bromide, $SrBr_2 + 6H_2O$	0.017647
Strontium Iodide, $SrI_2 + 6H_2O$	0.022301

	Gramme.
Zinc Bromide, $ZnBr_2$	0.011181
Zinc Chloride, $ZnCl_2$	0.006763
Zinc Iodide, ZnI_2	0.015835

148. Tenth-Normal Sodium Chloride Volumetric Solution

$NaCl = 58.06$. 5.806 Gm. in 1000 Cc.

Dissolve 5.806 Gm. of pure sodium chloride (see below) in sufficient water to measure, at 25° C. (77° F.), exactly 1000 Cc.

Pure Sodium Chloride may be prepared by passing a current of dry hydrochloric acid gas into a saturated aqueous solution of the purest commercial sodium chloride, collecting the crystalline precipitate on a filter, washing with a little pure concentrated hydrochloric acid, draining, pulverizing, and igniting it gently in a crucible heated to low redness, to expel all traces of free acid. Care should be taken to avoid fusion.

One Cubic Centimeter of Tenth-Normal Sodium Chloride V.S. is the equivalent of:

	Gramme.
Sodium Chloride, $NaCl$	0.005806
Silver, Ag	0.010712
Silver Nitrate, $AgNO_3$	0.016869
Silver Oxide, Ag_2O	0.011506

149. Double-Normal Sodium Hydroxide Volumetric Solution

$NaOH = 39.76$. 79.52 Gm. in 1000 Cc.

Dissolve 90 Gm. of sodium hydroxide [*Sodii Hydroxidum*, U. S. P.] in sufficient water to measure about 1000 Cc.

For the standardization of this approximate solution of sodium hydroxide proceed as directed under normal potassium hydroxide V.S. (see No. 140); 25 Cc. of the volumetric solution, at 25° C. (77° F.), should exactly neutralize 9.339 Gm. of pure potassium bitartrate (see No. 80).

NOTE.—The same precautions should be taken for protecting this solution from the carbon dioxide of the air as are prescribed for normal potassium hydroxide V.S. (see No. 140).

150. Normal Sodium Hydroxide Volumetric Solution

$NaOH = 39.76$. 39.76 Gm. in 1000 Cc.

Dissolve 54 Gm. of sodium hydroxide [*Sodii Hydroxidum*, U. S. P.] in sufficient water to measure about 1050 Cc., and fill a burette with a portion of this liquid.

For the standardization of this approximate solution of sodium hydroxide, proceed as directed under normal potassium hydroxide V.S. (see No. 140); 50 Cc. of the volumetric solution, at 25° C. (77° F.), must exactly neutralize 9.339 Gm. of pure potassium bitartrate.

NOTE.—The same precautions should be taken for protecting this solution from the carbon dioxide of the air as are prescribed for normal potassium hydroxide V.S. (see No. 140).

This solution may be employed in place of the normal potassium hydroxide V.S. (see No. 140), volume for volume.

One Cubic Centimeter of Normal Sodium Hydroxide V.S. is the equivalent of:

	Gramme.
Sodium Hydroxide, $NaOH$	0.03976
Boric Acid, H_3BO_3	0.06154
Formaldehyde, CH_2O	0.02979
Trichloracetic Acid, $HC_2Cl_3O_2$	0.16212

151. Tenth-Normal Sodium Thiosulphate Volumetric Solution

$Na_2S_2O_3 + 5H_2O = 246.46.$ 24.646 Gm. in 1000 Cc.

Dissolve 30 Gm. of sodium thiosulphate (see No. 113) in sufficient distilled water to measure 1000 Cc. This trial solution, which is too concentrated, is standardized as follows:

To a solution of about 1 Gm. of potassium iodide [*Potassii Iodidum*, U. S. P.] in 10 Cc. of diluted sulphuric acid contained in a flask of about 500 Cc. capacity, add slowly, from a burette, 20 Cc. of tenth-normal potassium dichromate V.S., shaking after each addition. Place a watch-glass on the mouth of the flask and allow it to stand for five minutes, then dilute the solution with about 250 Cc. of distilled water, add some starch T.S., and then, from a burette, the trial solution of sodium thiosulphate, in small portions at a time, shaking after each addition, and, toward the end of the operation, reducing the flow to drops, until the blue color of the mixture changes to a light green; note the number of Cc. of the trial sodium thiosulphate solution consumed. Then dilute the sodium thiosulphate solution so that equal volumes of it and the tenth-normal potassium dichromate V.S. will exactly correspond to each other under the above conditions, at 25° C. (77° F.).

EXAMPLE.—Assuming that 16 Cc. of the trial sodium thiosulphate solution were required to decolorize the liberated iodine of the mixture, then each 16 Cc. of this solution must be diluted to 20 Cc. so that it will correspond in volume to the tenth-normal potassium dichromate V.S. added, or the whole of the remaining solution in the same proportion at 25° C. (77° F.). Thus, if 984 Cc. of the sodium thiosulphate solution are remaining, this should be diluted to measure 1230 Cc. After the sodium thiosulphate solution is thus diluted, a new trial should be made in the manner above described, in which exactly 20 Cc. of this solution should be required to decolorize the iodine liberated by 20 Cc. of the tenth-normal dichromate V.S. If necessary, a new adjustment should be made to render the correspondence perfect.

Keep the solution in glass-stoppered bottles, carefully protected from dust.

NOTE.—When this solution is to be used, fill a burette with it, place the liquid to be tested either for the free iodine it already contains, or for that which it liberates from an excess of potassium iodide added to it, in a flask, and gradually add small portions of the solution from the burette, shaking after each addition, and, toward the end of the operation, reducing the flow to drops, until the color is discharged.

One Cubic Centimeter of Tenth-Normal Sodium Thiosulphate V.S. is the equivalent of:

	Gramme.
Sodium Thiosulphate (Hyposulphite), $Na_2S_2O_3 + 5H_2O$	0.024646
Bromine, Br	0.007936
Chlorine, Cl	0.003518
Chromium Trioxide, CrO_3	0.003311
Iodine, I	0.01259
Iron, Fe, in ferric salts	0.00555
Potassium Bromate, $KBrO_3$	0.002764

152. Normal Sulphuric Acid Volumetric Solution

$H_2SO_4 = 97.35.$ 48.675 Gm. in 1000 Cc.

Carefully mix 30 Cc. of pure, concentrated sulphuric acid (of specific gravity 1.826 at 25° C. (77° F.) with sufficient water to measure about 1050 Cc., and allow the liquid to cool to 25° C. (77° F.). Measure from a burette 10 Cc. of this liquid (which is yet too concentrated) into a flask, add 2 drops of methyl-orange T.S., and afterwards, from a burette, a freshly standardized normal potassium hydroxide V.S., shaking after each addition, and, toward the end of the operation, reducing the flow to drops, until the red tint of the solution changes to a permanent pale yellow after thorough shaking. Note the number of Cc. of normal potassium hydroxide V.S. consumed. Then dilute the sulphuric acid solution so that equal volumes of this and of normal potassium hydroxide V.S., at 25° C. (77° F.), exactly neutralize each other.

EXAMPLE.—Assuming that 10 Cc. of the acid solution first prepared had required exactly 11.2 Cc. of normal potassium hydroxide V.S., each 10 Cc. of the former must be diluted to 11.2 Cc., or each 1000 Cc. to 1120 Cc.

After the liquid is thus diluted, a new trial should be made in the manner above described, in which 50 Cc. of the acid solution should require for neutralization exactly 50 Cc. of normal potassium hydroxide V. S., at 25° C. (77° F.). If necessary, a new adjustment should be made to render the correspondence perfect.

One Cubic Centimeter of Normal Sulphuric Acid V.S. is the equivalent of:

	Gramme.
Sulphuric Acid, absolute, H_2SO_4	0.048675
Ammonia Gas, NH_3	0.01693
Ammonium Carbonate, $(NH_4)_2CO_3$	0.047705
Ammonium Carbonate [U.S.P.], $NH_4HCO_3.NH_4NH_2CO_2$	0.052003
Calcium Hydroxide, $Ca(OH)_2$	0.03678
Lead Acetate, crystallized, $Pb(C_2H_3O_2)_2 + 3H_2O$	0.188075
Lead Subacetate, assumed as $Pb_2O(C_2H_3O_2)_2$	0.135935
Lithium Carbonate, Li_2CO_3	0.036755
Magnesium Carbonate, $(MgCO_3)_4(MgOH)_2 + 5H_2O$	0.048226
Magnesium Oxide, MgO	0.02003
Potassium Acetate, $KC_2H_3O_2$ (after ignition)	0.09744
Potassium Bicarbonate, $KHCO_3$	0.09941
Potassium Bitartrate, $KHC_4H_4O_6$ (after ignition)	0.18678
Potassium Carbonate, anhydrous, K_2CO_3	0.068635
Potassium Citrate, cryst., $K_3C_6H_5O_7 + H_2O$ (after ignition)	0.10736
Potassium Hydroxide, KOH	0.05574
Potassium and Sodium Tartrate, $KNaC_4H_4O_6 + 4H_2O$ (after ignition)	0.14009
Sodium Acetate, $NaC_2H_3O_2 + 3H_2O$ (after ignition)	0.13510
Sodium Benzoate, $NaC_7H_5O_2$ (after ignition)	0.14301
Sodium Bicarbonate, $NaHCO_3$	0.08343
Sodium Borate, crystallized, $Na_2B_4O_7 + 10H_2O$	0.18966
Sodium Hydroxide, $NaOH$	0.03976
Sodium Salicylate, $NaC_7H_5O_3$ (after ignition)	0.15889
Zinc Oxide, ZnO	0.04039

153. Half-Normal Sulphuric Acid Volumetric Solution

$H_2SO_4 = 97.35$. 24.3375 Gm. in 1000 Cc.

Dilute 500 Cc. of normal sulphuric acid with sufficient water to measure 1000 Cc. at 25° C. (77° F.).

This standard solution is chiefly employed in the titration of the organic salts of sodium and potassium in conjunction with methyl-orange as indicator. For this purpose a special experiment should be made in which an accurately measured volume of 10 Cc. of normal potassium hydroxide V.S. should, after adding 2 drops of methyl-orange T.S., require exactly 20 Cc. of the half-normal sulphuric acid V.S. for neutralization.

If necessary, an adjustment should be made to render the correspondence perfect.

One Cubic Centimeter of Half-Normal Sulphuric Acid V.S. is the equivalent of:

	Gramme.
Sulphuric Acid, absolute, H_2SO_4	0.0243375
Ammonia Gas, NH_3 (Spirit of Ammonia)	0.008465
Potassium Acetate, $KC_2H_3O_2$ (after ignition)	0.04872
Potassium Bicarbonate, $KHCO_3$	0.049705
Potassium Bitartrate, $KHC_4H_4O_6$ (after ignition)	0.09339
Potassium Citrate, anhydrous, $K_3C_6H_5O_7$ (after ignition)	0.0507
Potassium Citrate, crystallized, $K_3C_6H_5O_7 + H_2O$ (after ignition)	0.05368
Potassium and Sodium Tartrate, $KNaC_4H_4O_6 + 4H_2O$ (after ignition)	0.070045
Sodium Acetate, $NaC_2H_3O_2 + 3H_2O$ (after ignition)	0.06755
Sodium Benzoate, $NaC_7H_5O_2$ (after ignition)	0.07150
Sodium Carbonate, anhydrous, Na_2CO_3	0.026327
Sodium Carbonate, monohydrated, $Na_2CO_3 + H_2O$	0.030797
Sodium Citrate, $2Na_3C_6H_5O_7 + 11H_2O$ (after ignition)	0.0591
Sodium Salicylate, $NaC_7H_5O_3$ (after ignition)	0.079445

154. Tenth-Normal Sulphuric Acid Volumetric Solution

$H_2SO_4 = 97.35$. 4.8675 Gm. in 1000 Cc.

Dilute 100 Cc. of normal sulphuric acid with sufficient water to measure 1000 Cc. at 25° C. (77° F.).

This standard solution is employed in conjunction with the fiftieth-normal potassium hydroxide V.S. in the titration of alkaloids, with hematoxylin, cochineal, or iodeosin T.S. as an indicator. For this purpose a special experiment should be made, in which an accurately measured volume of 10 Cc. of the tenth-normal sulphuric acid, after adding 1 Cc. of hematoxylin T.S. (or a sufficient quantity of the indicator to be employed), should require 50 Cc. of the fiftieth-normal potassium hydroxide V.S. for complete neutralization, at 25° C. (77° F.). If necessary, an adjustment should be made to render the correspondence perfect.

One Cubic Centimeter of Tenth-Normal Sulphuric Acid V.S. is the equivalent of:

	Gramme.
Sulphuric Acid, absolute, H_2SO_4	0.0048675
Potassium Hydroxide, KOH	0.005574
Aconitine, $C_{34}H_{47}NO_{11}$	0.06406
Atropine, $C_{17}H_{23}NO_3$	0.02870
Brucine, $C_{23}H_{26}N_2O_4$	0.03913
Calcium Hydroxide, $Ca(OH)_2$	0.003678
Cephaëline, $C_{14}H_{19}NO_2$	0.02314
Cinchonidine, $C_{19}H_{22}N_2O$	0.02920
Cinchonine, $C_{19}H_{22}N_2O$	0.02920
Combined Alkaloids of Cinchona	0.03069
Combined Alkaloids of Ipecac	0.02384
Cocaine, $C_{17}H_{21}NO_4$	0.03009
Coniine, $C_8H_{17}N$	0.01262
Emetine, $C_{15}H_{21}NO_2$	0.02453
Hydrastine, $C_{21}H_{21}NO_6$	0.03803
Morphine, crystallized, $C_{17}H_{19}NO_3 + H_2O$	0.03009
Morphine, anhydrous, $C_{17}H_{19}NO_3$	0.02830
Physostigmine, $C_{15}H_{21}N_3O_2$	0.02732
Pilocarpine, $C_{11}H_{16}N_2O_2$	0.02066
Quinine, $C_{20}H_{24}N_2O_2$	0.03218
Strychnine, $C_{21}H_{22}N_2O_2$	0.03317

155. Fiftieth-Normal Sulphuric Acid Volumetric Solution

$H_2SO_4 = 97.35$. 0.9735 Gm. in 1000 Cc.

Dilute 20 Cc. of normal sulphuric acid V.S., or 200 Cc. of tenth-normal sulphuric acid V.S., with sufficient distilled water to measure, at 25° C. (77° F.), 1000 Cc. This standard solution may be employed in the titration of alkaloids, with hematoxylin, cochineal, or iodeosin T.S. as an indicator.

One Cubic Centimeter of Fiftieth-Normal Sulphuric Acid V.S. is th
equivalent of:

	Gramm
Sulphuric Acid, absolute, H_2SO_4	0.0009
Aconitine, $C_{34}H_{47}NO_{11}$	0.0128
Atropine, $C_{17}H_{23}NO_3$	0.0057
Cinchonidine, $C_{19}H_{22}N_2O$	0.0058
Cinchonine, $C_{19}H_{22}N_2O$	0.0058
Combined Alkaloids of Cinchona	0.00613
Combined Alkaloids of Ipecac	0.00476
Cocaine, $C_{17}H_{21}NO_4$	0.00601
Coniine, $C_8H_{17}N$	0.00252
Hydrastine, $C_{21}H_{21}NO_6$	0.00760
Morphine, crystallized, $C_{17}H_{19}NO_3 + H_2O$	0.00601
Morphine, anhydrous, $C_{17}H_{19}NO_3$	0.00566
Physostigmine, $C_{15}H_{21}N_3O_2$	0.00546
Pilocarpine, $C_{11}H_{16}N_2O_2$	0.00413
Quinine, $C_{20}H_{24}N_2O_2$	0.00643
Strychnine, $C_{21}H_{22}N_2O_2$	0.00663

II. Alphabetical List of Volumetric Assays directed by the U. S. Pharmacopœia

Name.	Quantity taken.	Cubic Centimeters of Volumetric Solution required.	Indicator.	Percentage Strength of Product.
Acidum Aceticum	5.96 Gm.	36.0 Normal KOH	Phenolphthalein	36.0 abs. acid.
Acidum Aceticum Dilutum	23.80 Gm.	24.0 Normal KOH	Phenolphthalein	6.0 abs. acid.
Acidum Aceticum Glaciale	3.0 Cc.*	Normal KOH	Phenolphthalein	99.0 abs. acid.
Acidum Boricum	1.00 Gm.	16.2 Normal NaOH	Phenolphthalein	99.8 pure acid.
Acidum Citricum	1.737 Gm.	24.87 Normal KOH	Phenolphthalein	99.5 pure acid.
Acidum Hydriodicum Dilutum	2.54 Gm.	20.0 Tenth-N. AgNO$_3$†	FeNH$_4$(SO$_4$)$_2$	10.0 abs. acid.
Acidum Hydrobromicum Dilutum	0.804 Gm.	10.0 Tenth-N. AgNO$_3$	K$_2$CrO$_4$	10.0 abs. acid.
Acidum Hydrochloricum	3.0 Cc.*	Normal KOH	Methyl-Orange	31.9 abs. acid.
Acidum Hydrochloricum Dilutum	3.62 Gm.	10.0 Normal KOH	Methyl-Orange	10.0 abs. acid.
Acidum Hydrocyanicum Dilutum	2.684 Gm.	10.0 Tenth-N. AgNO$_3$	KI	2.0 abs. acid.
Acidum Hypophosphorosum	6.55 Gm.	30.0 Normal KOH	Methyl-Orange	30.0 abs. acid.
Acidum Hypophosphorosum Dilutum	6.55 Gm.	10.0 Normal KOH	Methyl-Orange	10.0 abs. acid.
Acidum Lacticum	4.47 Gm.	37.5 Normal KOH.	Phenolphthalein	75.0 abs. acid.
Acidum Nitricum	3.0 Cc.*	Normal KOH	Methyl-Orange	68.0 abs. acid.
Acidum Nitricum Dilutum	6.257 Gm.	10.0 Normal KOH	Methyl-Orange	10.0 abs. acid.
Acidum Phosphoricum	0.973 Gm.	17.0 Normal KOH	Phenolphthalein	85.0 abs. acid.
Acidum Phosphoricum Dilutum	4.87 Gm.	10.0 Normal KOH	Phenolphthalein	10.0 abs. acid.
Acidum Sulphuricum	3.0 Cc.*	Normal KOH	Methyl-Orange	92.5 abs. acid.
Acidum Sulphuricum Aromaticum	4.868 Gm.	20.0 Normal KOH‡	Methyl-Orange	20.0 abs. acid.
Acidum Sulphuricum Dilutum	4.868 Gm.	10.0 Normal KOH	Methyl-Orange	10.0 abs. acid.
Acidum Sulphurosum	2.0 Cc.*	Tenth-N. Iodine§		6.0 SO$_2$.
Acidum Tartaricum	3.723 Gm.	49.8 Normal KOH	Phenolphthalein	99.5 pure acid.
Acidum Trichloraceticum	1.0 Gm.	6.1 Normal NaOH	Phenolphthalein	98.9 abs. acid.
Aconitum	10.0 Gm.	0.78 Tenth-N. H$_2$SO$_4$	Cochineal	0.5 aconitine.
Ammonii Bromidum	0.3 Gm.	31.6 Tenth-N. AgNO$_3$	K$_2$CrO$_4$	97.0 pure salt.

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* Weighed and calculated.

† Determined by residual titration with tenth-normal potassium sulphocyanate V.S.

‡ Determined by residual titration with normal sulphuric acid V.S.

§ Determined by residual titration with tenth-normal sodium thiosulphate V.S.

Alphabetical List of Volumetric Assays directed by the U. S. Pharmacopœia—*Continued*

Name.	Quantity taken.	Cubic Centimeters of Volumetric Solution required.	Indicator.	Percentage Strength of Product.
Ammonii Carbonas	2.0 Gm.	37.3 Normal H_2SO_4*	Litmus	97.0 pure salt.
Ammonii Chloridum	0.1 Gm.	18.73 Tenth-N. $AgNO_3$	K_2CrO_4	99.5 pure salt.
Antimonii et Potassii Tartras	0.33 Gm.	19.9 Tenth-N. Iodine	Starch	99.5 pure salt.
Aqua Ammoniæ	3.0 Cc.†	Normal H_2SO_4	Litmus or Methyl-Orange	10.0 NH_3.
Aqua Ammoniæ Fortior	3.0 Cc.†	Normal H_2SO_4	Litmus or Methyl-Orange	28.0 NH_3.
Aqua Hydrogenii Dioxidi	1.69 Cc.	30.0 Tenth-N. $KMnO_4$		3.0 H_2O_2.
Argenti Nitras	0.5 Gm.	29.6 Tenth-N. NaCl‡	K_2CrO_4	99.9 pure salt.
Argenti Nitras Fusus	0.5 Gm.	28.1 Tenth-N. NaCl‡	K_2CrO_4	94.8 $AgNO_3$.
Argenti Nitras Mitigatus	1.0 Gm.	19.7 Tenth-N. NaCl‡	K_2CrO_4	33.3 $AgNO_3$.
Arseni Iodidum	0.5 Gm.	21.9 Tenth-N. Iodine		82.7 iodine. 16.3 metallic arsenic.
Arseni Trioxidum	0.1 Gm.	20.3 Tenth-N. Iodine		99.8 As_2O_3.
Belladonnæ Folia	10.0 Gm.	1.22 Tenth-N. H_2SO_4	Cochineal	0.3 alkaloids.
Belladonnæ Radix	10.0 Gm.	1.74 Tenth-N. H_2SO_4	Cochineal	0.45 alkaloids.
Benzaldehydum	(Special process, see page 68)			85.0 C_7H_6O.
Calx Chlorinata	about 0.35 Gm.§	Tenth-N. $Na_2S_2O_3$		30.0 chlorine.
Chromii Trioxidum	0.0828 Gm.	22.5 Tenth-N. $Na_2S_2O_3$	Starch	90.0 CrO_3.
Cinnaldehydum	(Special process, see page 105)			95.0 C_9H_8O.
Coca	10.0 Gm.	1.66 Tenth-N. H_2SO_4	Cochineal	0.5 e.-s. alkaloids.
Emplastrum Belladonnæ	about 10.0 Gm.§	Tenth-N. H_2SO_4	Cochineal	0.38 to 0.42 alkaloids.
Extractum Belladonnæ Foliorum	5.0 Gm.	2.44 Tenth-N. H_2SO_4	Cochineal	1.4 alkaloids.
Extractum Hyoscyami	10.0 Gm.	1.04 Tenth-N. H_2SO_4	Cochineal	0.3 alkaloids.
Extractum Nucis Vomicæ	2.0 Gm.	3.01 Tenth-N. H_2SO_4	Iodeosin	5.0 strychnine.
Extractum Physostigmatis	0.5 Gm.	0.37 Tenth-N. H_2SO_4	Iodeosin	2.0 e.-s. alkaloids.

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* Determined by residual titration with normal potassium hydroxide V.S.

‡ Determined by residual titration with tenth-normal silver nitrate V.S.

† Weighed and calculated.

§ Afterwards weighed and calculated.

Extractum Scopolæ	2.0	Gm.	1.39	Tenth-N. H_2SO_4	Cochineal	2.0	alkaloids.
Extractum Stramonii	5.0	Gm.	2.44	Tenth-N. H_2SO_4	Cochineal	1.0	alkaloids.
Ferri Carbonas Saccharatus	1.15	Gm.	15.0	Tenth-N. $K_2Cr_2O_7$	$K_3Fe(CN)_6$	15.0	$FeCO_3$.
Ferri Chloridum	0.555	Gm.	22.0	Tenth-N. $Na_2S_2O_3$		22.0	metallic iron.
Ferri Citras	0.555	Gm.	16.0	Tenth-N. $Na_2S_2O_3$	Starch	16.0	metallic iron.
Ferri et Ammonii Citras	0.555	Gm.	16.0	Tenth-N. $Na_2S_2O_3$	Starch	16.0	metallic iron.
Ferri et Ammonii Sulphas	0.555	Gm.	11.5	Tenth-N. $Na_2S_2O_3$		11.5	metallic iron.
Ferri et Ammonii Tartras	0.555	Gm.	13.0	Tenth-N. $Na_2S_2O_3$	Starch	13.0	metallic iron.
Ferri et Potassii Tartras	0.555	Gm.	15.0	Tenth-N. $Na_2S_2O_3$	Starch	15.0	metallic iron.
Ferri et Quininæ Citras	0.555	Gm.	13.5	Tenth-N. $Na_2S_2O_3$	Starch	13.5	metallic iron.
Ferri et Quininæ Citras Solubilis	0.555	Gm.	13.5	Tenth-N. $Na_2S_2O_3$	Starch	13.5	metallic iron.
Ferri et Strychninæ Citras	1.11	Gm.	32.0	Tenth-N. $Na_2S_2O_3$	Starch	16.0	metallic iron.
Ferri Phosphas Solubilis	0.555	Gm.	12.0	Tenth-N. $Na_2S_2O_3$		12.0	metallic iron.
Ferri Pyrophosphas Solubilis	0.555	Gm.	10.0	Tenth-N. $Na_2S_2O_3$		10.0	metallic iron.
Ferri Sulphas (cryst. and gran.)	1.38	Gm.	49.75	Tenth-N. $KMnO_4$		99.5	pure crystals.
Ferrum Reductum	(Special process, see page 164)					90.0	metallic iron.
Fluidextractum Aconiti	10.0	Cc.	0.62	Tenth-N. H_2SO_4	Cochineal	0.4	Gm. aconitine in 100 Cc.
Fluidextractum Belladonnæ Radicis	10.0	Cc.	1.74	Tenth-N. H_2SO_4	Cochineal	0.4	Gm. alkaloids in 100 Cc.
Fluidextractum Cocæ	10.0	Cc.	1.66	Tenth-N. H_2SO_4	Cochineal	0.5	Gm. e.-s. alkaloids in 100 Cc.
Fluidextractum Hyoscyami	50.0	Cc.	1.30	Tenth-N. H_2SO_4	Cochineal	0.075	Gm. alkaloids in 100 Cc.
Fluidextractum Ipecacuanhæ	10.0	Cc.	7.34	Tenth-N. H_2SO_4	Cochineal	1.5	Gm. alkaloids in 100 Cc.
Fluidextractum Nucis Vomicæ	20.0	Cc.	6.02	Tenth-N. H_2SO_4	Iodeosin	1.0	Gm. strychnine in 100 Cc.
Fluidextractum Pilocarpi	10.0	Cc.	1.936	Tenth-N. H_2SO_4	Cochineal	0.4	Gm. alkaloids in 100 Cc.
Fluidextractum Scopolæ	10.0	Cc.	1.74	Tenth-N. H_2SO_4	Cochineal	0.5	Gm. alkaloids in 100 Cc.

Alphabetical List of Volumetric Assays directed by the U. S. Pharmacopœia—*Continued*

Name.	Quantity taken.	Cubic Centimeters of Volumetric Solution required.	Indicator.	Percentage Strength of Product.
Fluidextractum Stramonii	10.0 Cc.	1.22 Tenth-N. H_2SO_4	Cochineal	0.25 Gm. alkaloids in 100 Cc.
Hyoscyamus........................	25.0 Gm.	0.69 Tenth-N. H_2SO_4	Cochineal	0.08 alkaloids.
Iodum	about 0.5 Gm.*	Tenth-N. $Na_2S_2O_3$		99.0 iodine.
Ipecacuanha........................	10.0 Gm.	8.03 Tenth-N. H_2SO_4	Cochineal	1.75 ipecac alkaloids.
Liquor Acidi Arsenosi...............	24.6 Gm.	50.0 Tenth-N. Iodine		1.0 As_2O_3.
Liquor Calcis	50.0 Cc.	19.0 Tenth-N. H_2SO_4	Phenolphthalein	0.14 $Ca(OH)_2$.
Liquor Ferri Chloridi	1.11 Gm.	20.0 Tenth-N. $Na_2S_2O_3$	Starch	10.0 metallic iron.
Liquor Ferri Subsulphatis	1.11 Gm.	27.15 Tenth-N. $Na_2S_2O_3$	Starch	13.57 metallic iron.
Liquor Ferri Tersulphatis............	1.11 Gm.	20.0 Tenth-N. $Na_2S_2O_3$	Starch	10.0 metallic iron.
Liquor Formaldehydi	3.0 Cc.†	Normal NaOH‡	Litmus	37.0 CH_2O.
Liquor Iodi Compositus	6.3 Gm.	24.75 Tenth-N. $Na_2S_2O_3$		5.0 iodine.
Liquor Plumbi Subacetatis...........	0.272 Gm.	5.0 Tenth-N. $H_2C_2O_4$§		25.0 basic salt.
Liquor Potassii Arsenitis	24.6 Gm.	50.0 Tenth-N. Iodine		1.0 As_2O_3.
Liquor Potassii Citratis (to be ignited)	10.14 Gm.	16.0 Half-N. H_2SO_4	Methyl-Orange	8.0 $K_3C_6H_5O_7$.
Liquor Potassii Hydroxidi...........	27.87 Gm.	25.0 Normal H_2SO_4	Methyl-Orange	5.0 KOH.
Liquor Sodæ Chlorinatæ.............	7.0 Gm.	48.0 Tenth-N. $Na_2S_2O_3$		2.4 chlorine.
Liquor Sodii Hydroxidi	19.9 Gm.	25.0 Normal H_2SO_4	Methyl-Orange	5.0 NaOH.
Lithii Bromidum	0.2 Gm.	22.5 to 23.9 Tenth-N. $AgNO_3$	K_2CrO_4	97.0 pure salt.
Lithii Carbonas.....................	0.5 Gm.	13.4 Normal H_2SO_4	Methyl-Orange‖	98.5 pure salt.
Magnesii Carbonas (to be ignited)....	1.0 Gm.	19.2 Normal H_2SO_4	Methyl-Orange‖	38.4 MgO.
Magnesii Oxidum (to be ignited).....	0.4 Gm.	19.2 Normal H_2SO_4	Methyl-Orange‖	96.0 MgO.
Magnesii Oxidum Ponderosum (see Magnesii Oxidum).				
Mangani Dioxidum Præcipitatum	0.2 Gm.	37.05 Tenth-N. $H_2C_2O_4$§		80.0 MnO_2.

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*Afterwards weighed and calculated.

†Weighed and calculated.

‡ Determined by oxidation to formic acid and residual titration with normal sulphuric acid V.S.

§ Determined by residual titration with tenth-normal potassium permanganate V.S.

‖ Determined by residual titration with normal potassium hydroxide V.S.

[illegible]	10.0	Gm.	3.76	Tenth-N. H_2SO_4	Iodeosin	1.25	strychnine.
[illegible] Amaræ	(Special process, see page 68)					85.0	benzaldehyde.
Oleum Amygdalæ Amaræ	1.0	Gm.	7.5 to 14.9	Tenth-N. $AgNO_3$	K_2CrO_4	2.0	to 4.0 HCN.
Oleum Limonis	(Special process, see page 316)					4.0	citral.
Oleum Menthæ Piperitæ	(Special process, see page 318)					6.0	menthyl acetate.
Oleum Menthæ Piperitæ	(Special process, see page 318)					50.0	total menthol.
Oleum Rosmarini	(Special process, see page 323)					2.5	bornyl acetate.
Oleum Rosmarini	(Special process, see page 323)					10.0	total borneol.
Oleum Santali	(Special process, see page 324)					90.0	santalol.
Oleum Sinapis Volatile	(Special process, see page 325)					92.0	allyl-iso-thiocyanate.
Phenol	0.0389	Gm.	24.0	Tenth-N. Bromine*		96.0	pure phenol.
Physostigma	10.0	Gm.	0.55	Tenth-N. H_2SO_4	Iodeosin	0.15	e.-s. alkaloids.
Pilocarpus	10.0	Gm.	2.42	Tenth-N. H_2SO_4	Cochineal	0.5	alkaloids.
Potassii Acetas (to be ignited)	1.0	Gm.	20.1	Half-N. H_2SO_4	Methyl-Orange	98.0	pure salt.
Potassii Bicarbonas	1.0	Gm.	19.9	Half-N. H_2SO_4	Methyl-Orange	99.0	pure salt.
Potassii Bitartras (to be ignited)	1.0	Gm.	10.6	Half-N. H_2SO_4	Methyl-Orange	99.0	pure salt.
Potassii Bromidum	0.3	Gm.	24.6 to 25.85	Tenth-N. $AgNO_3$	K_2CrO_4	97.0	pure salt.
Potassii Carbonas (after drying)	1.0	Gm.	14.28	Normal H_2SO_4	Methyl-Orange	98.0	pure salt.
Potassii Citras (to be ignited)	1.0	Gm.	18.4	Half-N. HCl	Methyl-Orange	99.0	pure salt.
Potassii Cyanidum	0.647	Gm.	47.5	Tenth-N. $AgNO_3$	KI	95.0	pure salt.
Potassii et Sodii Tartras (to be ignited)	1.0	Gm.	14.1	Half-N. HCl	Methyl-Orange	99.0	pure salt.
Potassii Hydroxidum	about 1.0	Gm.†		Normal H_2SO_4	Methyl-Orange	85.0	KOH.
Potassii Iodidum	0.5	Gm.	30.0 to 30.8	Tenth-N. $AgNO_3$	K_2CrO_4	99.0	pure salt.
Potassii Permanganas	0.1	Gm.	31.5	Tenth-N. $H_2C_2O_4$		99.0	$KMnO_4$.
Scopola	10.0	Gm.	1.74	Tenth-N. H_2SO_4	Cochineal	0.5	alkaloids.
Sodii Acetas (to be ignited)	1.0	Gm.	14.74	Half-N. H_2SO_4	Methyl-Orange	99.5	pure salt.

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* Determined by residual titration with tenth-normal sodium thiosulphate V.S.

† Afterwards weighed and calculated.

Alphabetical List of Volumetric Assays directed by the U. S. Pharmacopœia—*Continued*

Name.	Quantity taken.	Cubic Centimeters of Volumetric Solution required.	Indicator.	Percentage Strength of Product.
Sodii Benzoas (to be ignited)	1.0 Gm.	13.85 Half-N. HCl	Methyl-Orange	99.0 pure salt.
Sodii Bicarbonas	2.0 Gm.	23.74 Normal H_2SO_4	Methyl-Orange	99.0 pure salt.
Sodii Bisulphis	0.25 Gm.	43.55 Tenth-N. Iodine*		90.0 pure salt.
Sodii Bromidum	0.3 Gm.	28.5 to 30.0 Tenth-N. $AgNO_3$	K_2CrO_4	97.0 pure salt.
Sodii Carbonas Monohydratus	1.0 Gm.	32.3 Half-N. H_2SO_4	Methyl-Orange	85.0 anhydrous salt.
Sodii Chloridum	0.1 Gm.	17.0 Tenth-N. $AgNO_3$	K_2CrO_4	99.0 pure salt.
Sodii Citras (to be ignited)	1.0 Gm.	16.4 Half-N. H_2SO_4	Methyl-Orange	97.0 pure salt.
Sodii Hydroxidum	about 1.0 Gm.†	Normal H_2SO_4	Methyl-Orange	90.0 NaOH.
Sodii Iodidum	0.5 Gm.	33.0 to 34.6 Tenth-N. $AgNO_3$	K_2CrO_4	98.0 pure salt.
Sodii Nitris	0.1 Gm.	26.25 Tenth-N. $KMnO_4$‡		90.0 pure salt.
Sodii Salicylas (to be ignited)	1.0 Gm.	12.52 Half-N. H_2SO_4	Methyl-Orange	99.5 pure salt.
Sodii Sulphis	0.5 Gm.	37.55 Tenth-N. Iodine*		94.0 pure salt.
Sodii Thiosulphas	1.0 Gm.	39.75 Tenth-N. Iodine		98.0 pure salt.
Spiritus Ammoniæ	2.0 Cc.†	Half-N. H_2SO_4	Litmus	10.0 NH_3.
Strontii Bromidum	0.5 Gm.	27.48 to 29.4 Tenth-N. $AgNO_3$	K_2CrO_4	97.0 pure salt.
Strontii Iodidum	0.5 Gm.	21.9 to 23.3 Tenth-N. $AgNO_3$§	$FeNH_4(SO_4)_2$	98.0 pure salt.
Sulphuris Iodidum	0.5 Gm.	28.0 Tenth-N. $Na_2S_2O_3$	Starch	about 80.0 iodine.
Syrupus Acidi Hydriodici	6.345 Gm.	5.0 Tenth-N. $AgNO_3$§	$FeNH_4(SO_4)_2$	1.0 HI.
Syrupus Ferri Iodidi	1.536 Gm.	5.0 Tenth-N. $AgNO_3$§	$FeNH_4(SO_4)_2$	5.0 FeI_2.
Tinctura Aconiti	100.0 Cc.	0.70 Tenth-N. H_2SO_4	Cochineal	0.045 Gm aconitine in 100 Cc.
Tinctura Belladonnæ Foliorum	100.0 Cc.	1.22 Tenth-N. H_2SO_4	Cochineal	0.03 Gm. alkaloids in 00 Cc.

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* Determined by residual titration with tenth-normal sodium thiosulphate V.S.

† Afterwards weighed and calculated.

‡ Determined by residual titration with tenth-normal oxalic acid V.S.

§ Determined by residual titration with tenth-normal potassium sulphocyanate V.S.

Tinctura Ferri Chloridi	2.22	Gm.	18.3	Tenth-N. $Na_2S_2O_3$	Starch	4.58	metallic iron.
Tinctura Hyoscyami	100.0	Cc.	0.24	Tenth-N. H_2SO_4	Cochineal	0.007	Gm. alkaloids in 100 Cc.
Tinctura Iodi	5.0	Cc.	27.25	Tenth-N. $Na_2S_2O_3$		6.86	Gm. iodine in 100 Cc.
Tinctura Physostigmatis	100.0	Cc.	0.51	Tenth-N. H_2SO_4	Iodeosin	0.014	Gm.e.-s.alkaloids in 100 Cc.
Tinctura Stramonii	100.0	Cc.	1.05	Tenth-N. H_2SO_4	Cochineal	0.025	Gm. alkaloids in 100 Cc.
Vinum Album	50.0	Cc.	3.0 to 5.2	Normal KOH	Litmus	0.45	to 0.77 acid.
Vinum Rubrum	50.0	Cc.	3.0 to 5.2	Normal KOH	Litmus	0.45	to 0.77 acid.
Zinci Bromidum	0.3	Gm.	26.0 to 26.8	Tenth-N. $AgNO_3$	K_2CrO_4	97.0	pure salt.
Zinci Iodidi	0.5	Gm.	31.0 to 31.6	Tenth-N. $AgNO_3$*	$FeNH_4(SO_4)_2$	98.0	pure salt.
Zinci Oxidum	1.0	Gm.	24.5	Normal HCl†	Methyl-Orange	99.0	ZnO.

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* Determined by residual titration with tenth-normal potassium sulphocyanate V.S.
† Determined by residual titration with normal potassium hydroxide V.S.

III. Gasometric Estimations

In certain cases the Pharmacopœia directs the strength of a product or chemical substance to be determined by the volume of gas (nitrogen dioxide) given off during a definite reaction. This volume is to be determined by the nitrometer in the following manner:

Arrange a nitrometer consisting of a measuring tube (graduated for at least 50 Cc.) connected by stout rubber tubing with an open equilibrium tube (both tubes, preferably, provided with a globular expansion near the lower end) in such a manner, by suitable clamps attached to a stand, that either tube may be readily and quickly clamped at a higher or lower level. The stop-cock of the measuring tube having been opened, and the open equilibrium tube having been raised to a higher level, pour into the latter a saturated aqueous solution of sodium chloride, until the measuring tube, including the bore of the stop-cock, is completely filled. Then close the latter and fix the equilibrium tube at a low level. Having ascertained that the stop-cock is closed air-tight, and having, if necessary, wiped out the graduated tube of the nitrometer, introduce into it the prescribed quantity of the liquid to be tested, and allow this to flow slowly into the measuring tube, being careful not to admit any air. Follow it by the prescribed quantities of the several reagents (potassium iodide T.S., and normal sulphuric acid V.S.). When the reaction, which takes place at once, moderates, remove the measuring tube from its clamp, and, being careful to hold it constantly so that the liquid contained in it stands at a higher level than that in the equilibrium tube, shake its contents, without permitting any gas to pass into the open tube. When the reaction has completely ceased, restore the tube to its fastening, and allow the apparatus and contents to acquire the ordinary temperature of the room, which is assumed to be at or about 25° C. (77° F.). Then adjust the two tubes so that the liquid columns are at exactly the same level, and read off the volume of gas in the measuring tube. Multiply this figure by the weight of the substance, which is the equivalent of 1 Cc. of nitrogen dioxide (see No. 156, page 578). The result will be the weight of the pure substance (nitrite) contained in the amount taken for the assay.

For pharmacopœial purposes the determination will be sufficiently exact if the evolved gas be measured at or near 25° C. (77° F.).

Since temperature and barometric pressure materially affect the volume of the gas, the following correction factors must be used to obtain reasonably exact results when the temperature and pressure are not nearly normal. The barometer correction is important at any locality more than 250 meters above sea-level:

Factors for Temperature Corrections

(Normal Temperature, 25° C.)

Temperature.	Factor.	Temperature.	Factor.	Temperature.	Factor.
15° C.	1.035	22° C.	1.010	29° C.	0.987
16° C.	1.031	23° C.	1.007	30° C.	0.983
17° C.	1.028	24° C.	1.003	31° C.	0.980
18° C.	1.024	25° C.	1.000	32° C.	0.977
19° C.	1.021	26° C.	0.997	33° C.	0.974
20° C.	1.017	27° C.	0.993	34° C.	0.971
21° C.	1.014	28° C.	0.990	35° C.	0.968

EXAMPLE.—Assuming that the volume of gas read off was 44.5 Cc. at 32° C. (89.6° F.), and it is desired to ascertain the corresponding volume at 25° C. (77° F.), barometric pressure not being taken into consideration, then the 44.5 Cc. must be reduced in the proportion of 1 to 0.977 (see temperature correction factors above), or 44.5 must be multiplied by 0.977. The result will be 43.48 (43.4765) Cc. as the equivalent volume of gas at 25° C. (77° F.).

Factors for Correction for Barometric Pressure

(Normal Barometer, 760 Mm.)

Barometer Reading.		Factor.	Barometer Reading.		Factor.
Mm.	Inches.		Mm.	Inches.	
790	31.10	1.039	660	25.98	0.868
780	30.71	1.026	650	25.59	0.855
770	30.31	1.013	640	25.20	0.842
760	29.92	1.000	630	24.80	0.829
750	29.53	0.987	620	24.41	0.816
740	29.13	0.974	610	24.02	0.803
730	28.74	0.961	600	23.62	0.789
720	28.35	0.947	590	23.23	0.776
710	27.95	0.934	580	22.83	0.763
700	27.56	0.921	570	22.44	0.750
690	27.17	0.907	560	22.05	0.737
680	26.77	0.895	550	21.65	0.724
670	26.38	0.882			

EXAMPLE.—Assuming that the volume of gas read off was 43.48 (43.4765) Cc. at 590 Mm. barometric pressure, and it is desired to ascertain the corresponding volume at normal barometric pressure (760 Mm.), temperature not being taken into consideration, then the

[illegible]

[illegible] Estimation of [illegible]

[illegible]

[illegible] Alkaloidal Assay by Immiscible Solvents

[illegible] is dissolved by the [illegible] transferred to [illegible] and largely diluted [illegible] alkaloid forms a salt. [illegible] is found in the aqueous solution. This process is sometimes repeated, in case the alkaloidal solution is still colored. The apparatus used in this operation of shaking out is termed a "separator," and consists of an oval or pear-shaped glass vessel, with an opening at the top supplied with a well-ground glass stopper, and an outlet tube at the bottom, provided with an accurately fitting glass stop cock. The solvents directed to be used in the Pharmacopoeia are alcohol, chloroform, ether, and various mixtures of these containing at least 75 parts of ether in 100 parts of solvent by volume. In the case of chloroform, the solvent will collect at the bottom of the separator, and can be drawn off, but the ethereal or ether-chloroform mixture will form the upper portion of the liquid in the separator, and the aqueous layer must first be drawn off into a suitable vessel, and the ethereal layer then transferred to another vessel. It is not necessary or desirable to shake the mixture of immiscible solvent and water violently, for a rotation of the separator or a gentle shaking for about a minute will answer all purposes. At times, an emulsion of the water and the solvent is formed, especially if the shaking is too violent, and in order to separate this, it is advisable to proceed as follows : If the solvent is heavier than the water, add more of the former, a little water, and a slight amount of alcohol ; if the solvent is lighter than the water, add sufficient saturated sodium chloride solution or crystals of sodium chloride. A safe procedure to avoid the forming of emulsions is to invert the separator several times, and then to at once begin rotating to keep the solvents well mixed. To insure a complete extraction of the alkaloid, it is desirable to treat the liquid three times with the immiscible solvent,* and this is to be followed by a rinsing of the empty separator with repeated small portions of the same solvent. The separator should not be filled to more than two-thirds of its capacity at any time, and if its contents should become heated by the neutralization of acid by alkali, or *vice versa*, it should be cooled to the temperature of the room, before opening the stopper, by immersing it in running water. The final operation must always be the collection of the free alkaloid by the use of a portion of the immiscible solvent, drawing this off into a beaker, rinsing with small portions of the solvent to prevent possible loss. The beaker is then placed on a water-bath and gently heated, to remove the solvent by evaporation, leaving the alkaloids in the beaker in the dry form, and usually in the condition of a resinous or varnish-like mass. It is then either weighed as such or dissolved in volumetric acid solution, delivered in measured quantity from a burette, and the excess of the acid titrated with volumetric alkali solution with the use of an indicator. Should the final residual alkaloids still be slightly colored, it is preferable to employ iodeosin as the indicator, as the alkaloidal solution contains ether and the ethereal layer retains in solution coloring matter or impurity which may be present. If the alkaloids are not strongly colored, either hematoxylin or cochineal may safely be used.

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* If extraction is incomplete, the processes must be repeated with additional solvent. The completion of the "shaking out" processes may be tested in most cases by evaporating a small portion of the solution, dissolving the residue in acidulated water and adding mercuric potassium iodide T.S., when the absence of turbidity indicates exhaustion.

The quantity of alkaloid is found by multiplying the number of cubic centimeters of volumetric acid consumed by a constant factor, depending upon the molecular weight of the individual alkaloid. These factors will be found in this Appendix, on page 567, under Tenth-Normal Sulphuric Acid, V.S. (No. 154), and are used throughout the text without explanation. The factor in each case represents the weight in grammes of the alkaloid required to neutralize 1 Cc. of volumetric acid.

V. Determination of the Optical Rotation of Organic Substances

Many organic substances either liquid by nature or in solution in suitable solvents, when examined in a specially constructed polarizing apparatus or polaristrobometer, exhibit the property of circular polarization, or, in other words, are capable of rotating the plane of polarization of a ray of light either to the right or to the left. Such substances are termed "optically active," and when rotating to the right are designated as "dextro-rotatory" or "dextrogyrate," and when rotating to the left, as "lævo-rotatory" or "lævogyrate." Substances which do not possess this property of optical rotation are termed "optically inactive."

Among the substances recognized by this Pharmacopœia, there are several, particularly certain essential or volatile oils, and related bodies, for which the determination of the angle of rotation of a ray of polarized light, or, in some cases, the proof of their optical inactivity, affords the most simple and positive evidence of their identity or purity.

The instruments used for this purpose vary somewhat in their construction. Those which are most generally adapted for the examination of the substances mentioned above are the Polaristrobometer of Wild, in which the optical activity of the substance is manifested by the appearance or disappearance of dark, parallel stripes, or the so-called "half-shadow" instrument of Laurent, in which the two sides of the field of vision are capable of becoming unequally illuminated. Both of the instruments permit the angle of rotation to be read off in degrees or fractions of a degree of a circle.

These optical determinations are best made in a dark room, and by means of homogeneous or monochromatic light, the latter being obtained by introducing into a non-luminous flame, on a loop of platinum wire, a small bead of fused sodium chloride. The light thus radiated corresponds with the line D of the solar spectrum.

Since the deviation of the plane of polarization either to the right or to the left of the zero point is directly proportional to the length of the column of liquid, it is important that the observations should be made with tubes of a definite length, such as 100, 50, or 25 Mm. The selection of the length of the tube to be employed is, however, usually dependent upon the depth of color of the liquid and the extent of its optical rotation.

The rotatory power of an optically active, liquid substance, observed with sodium light, and referred to the ideal density 1, and in a tube having a length of 1 decimeter (100 Mm.), is designated as its *specific rotatory power*. This is usually expressed by the term $[\alpha]_D$. Since, however, not only the density of an optically active liquid, but also its rotation, is influenced by the temperature, the specific rotation varies with the latter. In stating the specific rotation it is, therefore, necessary to indicate at what temperature the rotation and the density of the liquid have been determined. But for the same temperature the specific rotation of a pure, optically active liquid is always a constant number. The temperature used in the text of this Pharmacopœia is 25° C. (77° F.).

For calculating the specific rotatory power of an optically active liquid substance, or solution of an optically active solid, the following formulas are of general application :

I. For liquid substances $[\alpha]_D = \frac{100 \times \alpha}{L \times d}$

II. For solutions of solids $[\alpha]_D = \frac{10000 \times \alpha}{L \times p \times d}$

or $[\alpha]_D = \frac{10000 \times \alpha}{L \times c}$

For calculating these formulas the determination of the following factors is necessary :

α = the angle of rotation of the liquid or solid observed with sodium light.

L = the length of the tube in millimeters.

d = the density or specific gravity of the active liquid.

p = the amount of active substance in 100 parts by weight of the solution.

c = the number of grammes of active substance in 100 cubic centimeters of the solution.

VI. List of the Elements and Principal Pharmacopœial Chemicals

With their Atomic or Molecular Weights and a Table of Multiples

NOTE.—This list contains the official chemicals and reagents of a definite composition, and also a few that are not official, but which are likely to be required in stoichiometrical calculations. The figures in the list given below are based upon the Table of International Atomic Weights, with Hydrogen taken as the unit. The elementary substances are also given in a separate list (see page 596). In the case of a few salts, for which this Pharmacopœia has given no formula on account of the difficulty of securing an absolutely uniform composition, the theoretical formula has been inserted merely for information. And in the case of many hydrated compounds the formula and molecular weight of the corresponding anhydrous compound have also been given, to save time in calculations.

		H = 1.
Acetaldehyde (See Aldehyde Acetic)		
Acetanilide (Phenylacetamide)	C_8H_9NO	134.09
Acetone	$(CH_3)_2CO$	57.61
Acetparaphenetidine (See Acetphenetidine)		
Acetphenetidine (Acetparaphenetidine)	$C_{10}H_{13}NO_2$	177.79
Acid, Acetic	$HC_2H_3O_2$	59.58
" Arsenous (See Arsenic Trioxide)		
" Aurochloric (See Acid, Chlorauric)		
" Benzoic	$HC_7H_5O_2$	121.13
" Boric	H_3BO_3	61.54
" Camphoric	$H_2C_{10}H_{14}O_4$	198.62
" Carbolic (See Phenol)		
" Carbonic (in solution)	H_2CO_3	61.55
" Chlorauric (Aurochloric)	$HAuCl_4 + 4H_2O$	408.94
" Chlorauric, Anhydrous (Gold Chloride)	$AuCl_3$	301.24
" Chloroplatinic	$H_2PtCl_6 + 6H_2O$	513.66
" Chromic (See Chromium Trioxide)		
" Cinnamic	$HC_9H_7O_2$	146.95
" Citric	$H_3C_6H_5O_7 + H_2O$	208.50
" " Anhydrous	$H_3C_6H_5O_7$	190.62
" Formic	$HCHO_2$	45.67
" Gallic	$HC_7H_5O_5 + H_2O$	186.65
" " Anhydrous	$HC_7H_5O_5$	168.77
" Hydriodic	HI	126.9
" Hydrobromic	HBr	80.36
" Hydrochloric	HCl	36.18
" Hydrocyanic	HCN	26.84
" Hydrofluoric	HF	19.9

Acid, Hydrosulphuric (See Hydrogen Sulphide)		
" Hypophosphorous	HPH_2O_2	65.53
" Lactic	$HC_3H_5O_3$	89.37
" Molybdic	H_2MoO_4	160.82
" Nitric	HNO_3	62.57
" Nitrous	HNO_2	46.69
" Oleic	$HC_{18}H_{33}O_2$	280.14
" Oxalic	$H_2C_2O_4 + 2H_2O$	125.10
" " Anhydrous	$H_2C_2O_4$	89.34
" Phosphoric	H_3PO_4	97.29
" Phosphorous	H_3PO_3	81.41
" Picric	$HC_6H_2(NO_2)_3O$	227.41
" Pyroboric (Tetraboric Acid)	$H_2B_4O_7$	156.76
" Pyrogallic (See Pyrogallol)		
" Salicylic	$HC_7H_5O_3$	137.01
" Stearic	$HC_{18}H_{35}O_2$	282.14
" Succinic	$H_2C_4H_4O_4$	117.16
" Sulphanilic	$HC_6H_4(NH_2)SO_3 + 3H_2O$	225.5
" " Anhydrous	$HC_6H_4(NH_2)SO_3$	171.86
" Sulphuric	H_2SO_4	97.35
" Sulphurous	H_2SO_3	81.47
" Tannic	$HC_{14}H_9O_9$	319.66
" Tartaric	$H_2C_4H_4O_6$	148.92
" Tetraboric (See Acid, Pyroboric)		
" Trichloracetic	$HC_2Cl_3O_2$	162.12
" Valeric (Valerianic)	$HC_5H_9O_2$	101.31
Aconitine	$C_{34}H_{47}NO_{11}$	640.55
Agaricin	$C_{16}H_{30}O_5 + H_2O$	317.84
Alcohol, Amylic	$C_5H_{11}OH$	87.43
" Ethylic (Ethyl Hydroxide)	C_2H_5OH	45.70
" Methylic	CH_3OH	31.79
Aldehyde, Acetic	C_2H_4O	43.70
" Benzoic (See Benzaldehyde)		
" Cinnamic (See Cinnamic Aldehyde)		
" Formic (See Formaldehyde)		
Allyl-iso-thiocyanate	$CSNC_3H_5$	98.40
Allyl-sulphocarbamide (See Thiosinamine)		
Alum (Aluminum and Potassium Sulphate)	$AlK(SO_4)_2 + 12H_2O$	471.02
" Anhydrous	$AlK(SO_4)_2$	256.46
Aluminum	**Al**	**26.9**
Aluminum Hydroxide	$Al(OH)_3$	77.54
" and Potassium Sulphate (See Alum)		
" Oxide	Al_2O_3	101.44
" Silicate	$H_2Al_2Si_2O_8 + H_2O$	257.12
" Sulphate	$Al_2(SO_4)_3 + 16H_2O$	625.93
" " Anhydrous	$Al_2(SO_4)_3$	339.85
Ammonia	NH_3	16.93
Ammonium Acetate	$NH_4C_2H_3O_2$	76.51

Ammonium Arsenite (Metarsenite)	NH_4AsO_2	124.09
" Benzoate	$NH_4C_7H_5O_2$	138.06
" Bromide	NH_4Br	97.29
" Carbonate (Normal)	$(NH_4)_2CO_3$	95.41
" " (U. S. P.)	$NH_4HCO_3.NH_4NH_2CO_2$	156.01
" Chloride	NH_4Cl	53.11
" Chloroplatinate	$(NH_4)_2PtCl_6$	440.24
" Citrate	$(NH_4)_3C_6H_5O_7$	241.41
" Hydrogen Sulphide	NH_4HS	50.76
" Iodide	NH_4I	143.83
" Lactate	$NH_4C_3H_5O_3$	106.30
" Molybdate	$(NH_4)_6Mo_7O_{24} + 4H_2O$	1227.32
" Nitrate	NH_4NO_3	79.50
" Oxalate	$(NH_4)_2C_2O_4 + H_2O$	141.08
" " Anhydrous	$(NH_4)_2C_2O_4$	123.20
" Phosphate	$(NH_4)_2HPO_4$	131.15
" Salicylate	$NH_4C_7H_5O_3$	153.94
" and Sodium Phosphate	$NH_4NaHPO_4 + 4H_2O$	207.62
" Sulphate	$(NH_4)_2SO_4$	131.21
" Sulphide	$(NH_4)_2S$	67.69
" Sulphhydroxide (See Ammonium Hydrogen Sulphide)		
" Tartrate	$(NH_4)_2C_4H_4O_6$	182.78
" Valerate (Valerianate) Neutral	$NH_4C_5H_9O_2$	118.24
Amyl Nitrite	$C_5H_{11}NO_2$	116.24
Amylene Hydrate	$C_5H_{12}O$	87.43
Anethol	$C_{10}H_{12}O$	146.98
Aniline	$C_6H_5NH_2$	92.39
Antimony	**Sb**	**119.3**
Antimony and Potassium Tartrate	$2K(SbO)C_4H_4O_6 + H_2O$	659.80
" " " " Anhydrous	$K(SbO)C_4H_4O_6$	320.96
" Oxide (See Antimony Trioxide)		
" Pentasulphide	Sb_2S_5	397.75
" Trioxide (Antimony Oxide)	Sb_2O_3	286.24
" Trisulphide	Sb_2S_3	334.09
Antipyrine	$C_{11}H_{12}N_2O$	186.75
Apomorphine Hydrochloride	$C_{17}H_{17}NO_2HCl$	301.34
Argon	**Ar**	**39.6**
Arsenic	**As**	**74.4**
Arsenic Trioxide (Arsenous Acid)	As_2O_3	196.44
Arsenous Iodide	AsI_3	452.10
" (Penta-) Sulphide	As_2S_5	307.95
Atropine	$C_{17}H_{23}NO_3$	287.04
" Sulphate	$(C_{17}H_{23}NO_3)_2H_2SO_4$	671.43
Barium	**Ba**	**136.4**
Barium Carbonate	$BaCO_3$	195.95
" Chloride	$BaCl_2 + 2H_2O$	242.52
" " Anhydrous	$BaCl_2$	206.76
" Chromate	$BaCrO_4$	251.62

Barium Dioxide	BaO_2	168.16
" Hydroxide	$Ba(OH)_2 + 8H_2O$	313.20
" " Anhydrous	$Ba(OH)_2$	170.16
" Nitrate	$Ba(NO_3)_2$	259.54
" Sulphate	$BaSO_4$	231.75
" Sulphide	BaS	168.23
Benzaldehyde (Benzoic Aldehyde)	C_7H_6O	105.25
Benzene (Benzole)	C_6H_6	77.46
Benzosulphinide	$C_7H_5NSO_3$	181.77
Benzoyl-sulphonic-imide (See Benzosulphinide)		
Betanaphthol (Naphthol)	$C_{10}H_7OH$	142.98
Bismuth	**Bi**	**206.9**
Bismuth Citrate	$BiC_6H_5O_7$	394.52
" Nitrate (Normal)	$Bi(NO_3)_3 + 5H_2O$	481.01
" Subcarbonate (approximately)	$(BiO)_2CO_3$	505.11
" Subgallate (approximately)	$Bi(OH)_2C_7H_5O_5$	408.43
" Subnitrate (approximately)	$Bi(OH)_2NO_3$	302.23
" Subsalicylate (approximately)	$Bi(OH)_2C_7H_5O_3$	376.67
" Sulphide	Bi_2S_3	509.29
" Trioxide	Bi_2O_3	461.44
Borneol	$C_{10}H_{18}O$	152.98
Bornyl Acetate	$C_{10}H_{17}C_2H_3O_2$	194.68
Boron	**B**	**10.9**
Boron Trioxide	B_2O_3	69.44
Bromine	**Br**	**79.36**
Bromoform	$CHBr_3$	250.99
Brucine	$C_{23}H_{26}N_2O_4 + 4H_2O$	462.83
" Anhydrous	$C_{23}H_{26}N_2O_4$	391.31
Cadmium	**Cd**	**111.6**
Cadmium Sulphate	$3CdSO_4 + 8H_2O$	763.89
" Sulphide	CdS	143.43
Caesium	**Cs**	**131.9**
Caffeine	$C_8H_{10}N_4O_2 + H_2O$	210.64
" Anhydrous	$C_8H_{10}N_4O_2$	192.76
Calcium	**Ca**	**39.8**
Calcium Bromide	$CaBr_2$	198.52
" Carbonate	$CaCO_3$	99.35
" Chloride	$CaCl_2 + 6H_2O$	217.44
" " Anhydrous	$CaCl_2$	110.16
" Fluoride	CaF_2	77.6
" Hydroxide	$Ca(OH)_2$	73.56
" Hypophosphite	$Ca(PH_2O_2)_2$	168.86
" Oxalate	$CaC_2O_4 + H_2O$	145.02
" Oxide (See Lime)		
" Phosphate	$Ca_3(PO_4)_2$	307.98
" Sulphate (Gypsum)	$CaSO_4 + 2H_2O$	170.91
" " Anhydrous	$CaSO_4$	135.15
" Sulphide (Monosulphide)	CaS	71.63

Camphor	$C_{10}H_{16}O$	150.98
“ Monobromated	$C_{10}H_{15}BrO$	229.34
Carbon	$\mathbf{C}$	**11.91**
Carbon Disulphide	CS_2	75.57
Carvone	$C_{10}H_{14}O$	148.98
Cephaëline	$C_{14}H_{19}NO_2$	231.43
Cerium	$\mathbf{Ce}$	**139.2**
Cerium Oxalate	$Ce_2(C_2O_4)_3 + 10H_2O$	719.22
“ “ Anhydrous	$Ce_2(C_2O_4)_3$	540.42
Chloral, Anhydrous	C_2HCl_3O	146.24
“ Hydrated	$C_2HCl_3O + H_2O$	164.12
Chloralformamide	$C_3H_4Cl_3NO_2$	190.96
Chlorine	$\mathbf{Cl}$	**35.18**
Chloroform	$CHCl_3$	118.45
Chromium	$\mathbf{Cr}$	**51.7**
Chromium Oxide	Cr_2O_3	151.04
“ Trioxide (Chromic Acid)	CrO_3	99.34
Chrysarobin	$C_{30}H_{26}O_7$	494.46
Cinchonidine	$C_{19}H_{22}N_2O$	292.03
“ Salicylate	$C_{19}H_{22}N_2OC_7H_6O_3$	429.04
“ Sulphate	$(C_{19}H_{22}N_2O)_2H_2SO_4 + 3H_2O$	735.05
“ “ Anhydrous	$(C_{19}H_{22}N_2O)_2H_2SO_4$	681.41
Cinchonine	$C_{19}H_{22}N_2O$	292.03
“ Sulphate	$(C_{19}H_{22}N_2O)_2H_2SO_4 + 2H_2O$	717.17
“ “ Anhydrous	$(C_{19}H_{22}N_2O)_2H_2SO_4$	681.41
Cineol (Eucalyptol)	$C_{10}H_{18}O$	152.98
Cinnamic Aldehyde	C_9H_8O	131.07
Citral	$C_{10}H_{16}O$	150.98
Cobalt	$\mathbf{Co}$	**58.56**
Cobaltous Nitrate	$Co(NO_3)_2 + 6H_2O$	288.98
“ Sulphate	$CoSO_4 + 7H_2O$	279.07
Cocaine	$C_{17}H_{21}NO_4$	300.92
“ Hydrochloride	$C_{17}H_{21}NO_4HCl$	337.10
Codeine	$C_{18}H_{21}NO_3 + H_2O$	314.83
“ Anhydrous	$C_{18}H_{21}NO_3$	296.95
“ Phosphate	$C_{18}H_{21}NO_3H_3PO_4 + 2H_2O$	430.0
“ “ Anhydrous	$C_{18}H_{21}NO_3H_3PO_4$	394.24
“ Sulphate	$(C_{18}H_{21}NO_3)_2H_2SO_4 + 5H_2O$	780.65
“ “ Anhydrous	$(C_{18}H_{21}NO_3)_2H_2SO_4$	691.25
Colchicine	$C_{22}H_{25}NO_6$	396.23
Columbium	$\mathbf{Cb}$	**93.3**
Coniine	$C_8H_{17}N$	126.21
Copper	$\mathbf{Cu}$	**63.1**
Cresol	$C_6H_4(CH_3)OH$	107.25
Cupricammonium Sulphate	$Cu(NH_3)_4SO_4 + H_2O$	244.05
Cupric Sulphate	$CuSO_4 + 5H_2O$	247.85
“ “ Anhydrous	$CuSO_4$	158.45
“ Sulphide	CuS	94.93

Cupric Tartrate	$CuC_4H_4O_6 + 3H_2O$	263.66
Diethylsulphone-dimethyl-methane (See Sulphonmethane)		
Diethylsulphone-methyl-ethyl-methane (See Sulphonethylmethane)		
Diphenylamine	$(C_6H_5)_2NH$	167.85
Dithymol-diiodide (See Thymol Iodide)		
Elaterin	$C_{20}H_{28}O_5$	345.60
Emetine	$C_{15}H_{21}NO_2$	245.34
Erbium	**Er**	**164.8**
Ether (Ethyl Oxide)	$(C_2H_5)_2O$	73.52
Ethyl Acetate	$C_2H_5C_2H_3O_2$	87.40
" Carbamate	$C_3H_7NO_2$	88.42
" Chloride	C_2H_5Cl	64.00
" Hydroxide (See Alcohol, Ethylic)		
" Nitrite	$C_2H_5NO_2$	74.51
" Oxide (See Ether)		
Eucalyptol (Cineol)	$C_{10}H_{18}O$	152.98
Eugenol	$C_{10}H_{12}O_2$	162.86
Ferric Acetate	$Fe(C_2H_3O_2)_3$	231.24
" Ammonium Sulphate	$FeNH_4(SO_4)_2 + 12H_2O$	478.69
" " " Anhydrous	$FeNH_4(SO_4)_2$	264.13
" Chloride	$FeCl_3 + 6H_2O$	268.32
" " Anhydrous	$FeCl_3$	161.04
" Hydroxide	$Fe(OH)_3$	106.14
" Hypophosphite	$Fe(PH_2O_2)_3$	249.09
" Nitrate	$Fe(NO_3)_3$	240.21
" Oxide	Fe_2O_3	158.64
" Phosphate (normal, not U. S. P.)	$FePO_4$	149.79
" Pyrophosphate (normal, not U. S. P.)	$Fe_4(P_2O_7)_3$	740.10
" Subsulphate (variable)		
" Sulphate (Tersulphate)	$Fe_2(SO_4)_3$	397.05
" Tersulphate (See Ferric Sulphate)		
Ferrous Bromide	$FeBr_2 + 6H_2O$	321.50
" " Anhydrous	$FeBr_2$	214.22
" Carbonate	$FeCO_3$	115.05
" Iodide	FeI_2	307.30
" Lactate	$Fe(C_3H_5O_3)_2 + 3H_2O$	285.88
" Sulphate	$FeSO_4 + 7H_2O$	276.01
" " Anhydrous	$FeSO_4$	150.85
" Sulphide	FeS	87.33
Fluorine	**F**	**18.9**
Formaldehyde (Formic Aldehyde)	CH_2O	29.79
Gadolinium	**Gd**	**155.0**
Gallium	**Ga**	**69.5**
Germanium	**Ge**	**71.9**
Glucinum	**Gl**	**9.03**
Glucose (See Sugar, Grape)		
Glycerin (Glycerol)	$C_3H_5(OH)_3$	91.37
Glyceryl Trinitrate (Nitroglycerin)	$C_3H_5(NO_3)_3$	225.44

Gold	**Au**	**195.7**
Gold Chloride, Anhydrous (See Acid Chlorauric, Anhydrous)		
Guaiacol	$C_7H_8O_2$	123.13
" Carbonate	$(C_7H_7O)_2CO_3$	272.05
Helium	**He**	**4.0**
Heroine Hydrochloride	$C_{17}H_{17}(C_2H_3O_2)_2NOHCl$	402.62
Hexamethylenamine	$C_6H_{12}N_4$	139.18
Hexamethylene Tetramine (See Hexamethylenamine)		
Homatropine Hydrobromide	$C_{16}H_{21}NO_3HBr$	353.49
Hydrastine	$C_{21}H_{21}NO_6$	380.32
" Hydrochloride	$C_{21}H_{21}NO_6HCl$	416.50
Hydrastinine Hydrochloride	$C_{11}H_{11}NO_2HCl$	223.88
Hydrogen	**H**	**1.00**
Hydrogen Dioxide	H_2O_2	33.76
" Sulphide (Hydrosulphuric Acid)	H_2S	33.83
Hyoscine Hydrobromide	$C_{17}H_{21}NO_4HBr + 3H_2O$	434.92
" " Anhydrous	$C_{17}H_{21}NO_4HBr$	381.28
Hyoscyamine Hydrobromide	$C_{17}H_{23}NO_3HBr$	367.40
" Sulphate	$(C_{17}H_{23}NO_3)_2H_2SO_4$	671.43
Indium	**In**	**113.1**
Iodeosin (Tetraiodo-fluorescein)	$C_{20}H_8I_4O_5$	829.20
Iodine	**I**	**125.90**
Iodoform	CHI_3	390.61
Iodol (Tetraiodopyrrol)	C_4I_4NH	566.17
Iridium	**Ir**	**191.5**
Iron	**Fe**	**55.5**
Iron Salts (See under *Ferric* and *Ferrous*)		
Krypton	**Kr**	**81.2**
Lanthanum	**La**	**137.9**
Lead	**Pb**	**205.35**
Lead Acetate	$Pb(C_2H_3O_2)_2 + 3H_2O$	376.15
" " Anhydrous	$Pb(C_2H_3O_2)_2$	322.51
" Carbonate	$(PbCO_3)_2Pb(OH)_2$	768.91
" Chloride	$PbCl_2$	275.71
" Chromate	$PbCrO_4$	320.57
" Iodide	PbI_2	457.15
" Nitrate	$Pb(NO_3)_2$	328.49
" Oxide	PbO	221.23
" Subacetate (approximately)	$Pb_2O(C_2H_3O_2)_2$	543.74
" Sulphate	$PbSO_4$	300.70
" Sulphide	PbS	237.18
Lime (Calcium Oxide)	CaO	55.68
Limonene	$C_{10}H_{16}$	135.10
Linalyl Acetate	$C_{10}H_{17}C_2H_3O_2$	194.68
Lithium	**Li**	**6.98**
Lithium Benzoate	$LiC_7H_5O_2$	127.11
" Bromide	$LiBr$	86.34
" Carbonate	Li_2CO_3	73.51

Lithium Citrate	$Li_3C_6H_5O_7 + 4H_2O$	280.08
“ Phosphate (dried at 100° C.)	Li_3PO_4	115 23
“ Salicylate	$LiC_7H_5O_3$	142.99
“ Sulphate Anhydrous	Li_2SO_4	109.31
Magnesia (See Magnesium Oxide)		
Magnesium	**Mg**	**24.18**
Magnesium Carbonate (approximately)	$(MgCO_3)_4Mg(OH)_2 + 5H_2O$	482.26
“ Oxide (Magnesia)	MgO	40.06
“ Pyroarsenate	$Mg_2As_2O_7$	308.32
“ Pyrophosphate	$Mg_2P_2O_7$	221.06
“ Sulphate	$MgSO_4 + 7H_2O$	244.69
“ “ Anhydrous	$MgSO_4$	119.53
Manganese	**Mn**	**54.6**
Manganese Dioxide	MnO_2	86.36
“ Hypophosphite	$Mn(PH_2O_2)_2 + H_2O$	201.54
Manganous Oxide	MnO	70.48
Manganous Sulphate	$MnSO_4 + 4H_2O$	221.47
“ “ Anhydrous	$MnSO_4$	149.95
Menthol	$C_{10}H_{19}OH$	154.98
Menthyl Acetate	$C_{10}H_{19}C_2H_3O_2$	196.68
Mercuricammonium Chloride	$HgNH_2Cl$	249.61
Mercuric Chloride	$HgCl_2$	268.86
“ Cyanide	$Hg(CN)_2$	250.18
“ Iodide	HgI_2	450.30
“ Nitrate	$Hg(NO_3)_2 + 4H_2O$	393.16
“ “ Anhydrous	$Hg(NO_3)_2$	321.64
“ Oxide	HgO	214.38
“ Potassium Iodide	$HgI_2 + 2KI$	779.82
“ Subsulphate	$Hg(HgO)_2SO_4$	722.61
“ Sulphate	$HgSO_4$	293.85
“ Sulphide	HgS	230.33
Mercurous Chloride	$HgCl$	233.68
“ Iodide	HgI	324.40
“ Nitrate	$HgNO_3 + H_2O$	277.95
“ Sulphate	Hg_2SO_4	492.35
Mercury	**Hg**	**198.5**
Methylacetanilide	$C_6H_5N(CH_3)C_2H_3O$	148.00
Methylene Blue (See Methylthionine Hydrochloride)		
Methyl-Orange (Sodium dimethylamidoazobenzene-sulphonate)	$NaC_{14}H_{14}N_3SO_3$	324.88
Methyl Salicylate	$CH_3C_7H_5O_3$	150.92
Methylthionine Hydrochloride	$C_{16}H_{18}N_3SCl$	317.36
Molybdenum	**Mo**	**95.3**
Morphine	$C_{17}H_{19}NO_3 + H_2O$	300.92
“ Anhydrous	$C_{17}H_{19}NO_3$	283.04
“ Acetate (variable)	$C_{17}H_{19}NO_3C_2H_4O_2 + 3H_2O$	396.26
“ Hydrochloride	$C_{17}H_{19}NO_3HCl + 3H_2O$	372.86
“ “ Anhydrous	$C_{17}H_{19}NO_3HCl$	319.22

[illegible]	[illegible]	143.3
[illegible]	[illegible]	35.50
[illegible]	[illegible]	99.42
" Bisulphate	$KHSO_4$	135.21
" Bitartrate	$KHC_4H_4O_6$	186.78
" Bromate	$KBrO_3$	165.86
Bromide	KBr	118.22
Carbonate	K_2CO_3	137.27

Potassium Chlorate	$KClO_3$	121.68
“ Chloride	KCl	74.04
“ Chloroplatinate	K_2PtCl_6	482.10
“ Chromate	K_2CrO_4	192.94
“ Citrate	$K_3C_6H_5O_7 + H_2O$	322.08
“ “ Anhydrous	$K_3C_6H_5O_7$	304.20
“ Cyanide	KCN	64.70
“ Dichromate (Potassium Bichromate)	$K_2Cr_2O_7$	292.28
“ Ferricyanide	$K_3Fe(CN)_6$	327.12
“ Ferrocyanide	$K_4Fe(CN)_6 + 3H_2O$	419.62
“ “ Anhydrous	$K_4Fe(CN)_6$	365.98
“ Hydroxide (Potassa)	KOH	55.74
“ Hypophosphite	KPH_2O_2	103.39
“ Iodide	KI	164.76
“ Lactate	$KC_3H_5O_3$	127.23
“ Nitrate	KNO_3	100.43
“ Permanganate	$KMnO_4$	156.98
“ Phosphate	K_2HPO_4	173.01
“ Salicylate	$KC_7H_5O_3$	174.87
“ and Sodium Tartrate	$KNaC_4H_4O_6 + 4H_2O$	280.18
“ “ “ “ Anhydrous	$KNaC_4H_4O_6$	208.66
“ Sulphate	K_2SO_4	173.07
“ Sulphite	$K_2SO_3 + 2H_2O$	192.95
“ “ Anhydrous	K_2SO_3	157.19
“ Sulphocyanate (Sulphocyanide)	$KSCN$	96.53
“ Tartrate	$2K_2C_4H_4O_6 + H_2O$	467.16
“ “ Anhydrous	$K_2C_4H_4O_6$	224.64
Praseodymium	**Pr**	**139.4**
Pyrogallol (Pyrogallic Acid)	$C_6H_6O_3$	125.10
Quinidine Sulphate	$(C_{20}H_{24}N_2O_2)_2H_2SO_4 + 2H_2O$	776.75
“ “ Anhydrous	$(C_{20}H_{24}N_2O_2)_2H_2SO_4$	740.99
Quinine	$C_{20}H_{24}N_2O_2 + 3H_2O$	375.46
“ Anhydrous	$C_{20}H_{24}N_2O_2$	321.82
“ Bisulphate	$C_{20}H_{24}N_2O_2H_2SO_4 + 7H_2O$	544.33
“ “ Anhydrous	$C_{20}H_{24}N_2O_2H_2SO_4$	419.17
“ Hydrobromide	$C_{20}H_{24}N_2O_2HBr + H_2O$	420.06
“ “ Anhydrous	$C_{20}H_{24}N_2O_2HBr$	402.18
“ Hydrochloride	$C_{20}H_{24}N_2O_2HCl + 2H_2O$	393.76
“ “ Anhydrous	$C_{20}H_{24}N_2O_2HCl$	358.00
“ Salicylate	$2C_{20}H_{24}N_2O_2C_7H_6O_3 + H_2O$	935.54
“ Sulphate	$(C_{20}H_{24}N_2O_2)_2H_2SO_4 + 7H_2O$	866.15
“ “ Anhydrous	$(C_{20}H_{24}N_2O_2)_2H_2SO_4$	740.99
“ Valerate (Valerianate)	$C_{20}H_{24}N_2O_2C_5H_{10}O_2 + H_2O$	441.01
Radium	**Ra**	**223.0**
Resorcinol (Resorcin)	$C_6H_6O_2$	109.22
Rhodium	**Rh**	**102.2**
Rubidium	**Rb**	**84.8**

Ruthenium	**Ru**	**100.9**
Saccharin (See Benzosulphinide)		
Safrol	$C_{10}H_{10}O_2$	160.86
Salicin	$C_{13}H_{18}O_7$	283.99
Salol (See Phenyl Salicylate)		
Samarium	**Sm**	**148.9**
Santalol	$C_{15}H_{26}O$	220.53
Santonin	$C_{15}H_{18}O_3$	244.29
Scandium	**Sc**	**43.8**
Scopolamine Hydrobromide	$C_{17}H_{21}NO_4HBr + 3H_2O$	434.92
" " Anhydrous	$C_{17}H_{21}NO_4HBr$	381.28
Selenium	**Se**	**78.6**
Silicon	**Si**	**28.2**
Silicon Oxide (Silica)	SiO_2	59.96
Silver	**Ag**	**107.12**
Silver Chloride	$AgCl$	142.30
" Cyanide	$AgCN$	132.96
" Iodide	AgI	233.02
" Nitrate	$AgNO_3$	168.69
" Oxide	Ag_2O	230.12
" Sulphate	Ag_2SO_4	309.59
" Sulphide	Ag_2S	246.07
Soda (See Sodium Hydroxide)		
Sodium	**Na**	**22.88**
Sodium Acetate	$NaC_2H_3O_2 + 3H_2O$	135.10
" " Anhydrous	$NaC_2H_3O_2$	81.46
" Arsenate	$Na_2HAsO_4 + 7H_2O$	309.84
" " Anhydrous	Na_2HAsO_4	184.68
" Arsenite (Metarsenite)	$NaAsO_2$	129.04
" Benzoate	$NaC_7H_5O_2$	143.01
" Bicarbonate	$NaHCO_3$	83.43
" Bisulphite	$NaHSO_3$	103.35
" Bitartrate	$NaHC_4H_4O_6 + H_2O$	188.68
" Borate	$Na_2B_4O_7 + 10H_2O$	379.32
" " Anhydrous	$Na_2B_4O_7$	200.52
" Bromate	$NaBrO_3$	149.88
" Bromide	$NaBr$	102.24
" Carbonate	$Na_2CO_3 + 10H_2O$	284.11
" " Anhydrous	Na_2CO_3	105.31
" " Monohydrated	$Na_2CO_3 + H_2O$	123.19
" Chlorate	$NaClO_3$	105.70
" Chloride	$NaCl$	58.06
" Citrate	$2Na_3C_6H_5O_7 + 11H_2O$	709.20
" " Anhydrous	$Na_3C_6H_5O_7$	256.26
" Cobaltic Nitrite	$Co_2(NO_2)_6\ 6NaNO_2 + H_2O$	820.56
" Dimethylamidoazo-benzene-sulphonate (See Methyl Orange)		
" Hydroxide (Soda)	$NaOH$	39.76
" Hypophosphite	$NaPH_2O_2 + H_2O$	105.29

Sodium Hyposulphite (See Sodium Thiosulphate)		
" Iodide	NaI	148.78
" Lactate	$NaC_3H_5O_3$	111.25
" Nitrate	$NaNO_3$	84.45
" Nitrite	$NaNO_2$	68.57
" Nitroprusside	$Na_2Fe(NO)(CN)_5 + 2H_2O$	296.03
" Phenolsulphonate (Sodium Sulphocarbolate)	$NaC_6H_5O_4S + 2H_2O$	230.45
" Phosphate	$Na_2HPO_4 + 12H_2O$	355.61
" " Anhydrous	Na_2HPO_4	141.05
" Pyrophosphate	$Na_4P_2O_7 + 10H_2O$	443.02
" " Anhydrous	$Na_4P_2O_7$	264.22
" Salicylate	$NaC_7H_5O_3$	158.89
" Sulphate	$Na_2SO_4 + 10H_2O$	319.91
" " Anhydrous	Na_2SO_4	141.11
" Sulphite	$Na_2SO_3 + 7H_2O$	250.39
" " Anhydrous	Na_2SO_3	125.23
" Sulphocarbolate (See Sodium Paraphenolsulphonate)		
" Tartrate	$Na_2C_4H_4O_6 + 2H_2O$	228.44
" Thiosulphate (Hyposulphite)	$Na_2S_2O_3 + 5H_2O$	246.46
" " Anhydrous	$Na_2S_2O_3$	157.06
Sparteine Sulphate	$C_{15}H_{26}N_2H_2SO_4 + 5H_2O$	419.26
" " Anhydrous	$C_{15}H_{26}N_2H_2SO_4$	329.86
Stannic Chloride	$SnCl_4$	258.82
Stannous Chloride	$SnCl_2 + 2H_2O$	224.22
Strontium	**Sr**	**86.94**
Strontium Bromide	$SrBr_2 + 6H_2O$	352.94
" " Anhydrous	$SrBr_2$	245.66
" Carbonate	$SrCO_3$	146.49
" Iodide	$SrI_2 + 6H_2O$	446.02
" " Anhydrous	SrI_2	338.74
" Lactate	$Sr(C_3H_5O_3)_2 + 3H_2O$	317.32
" " Anhydrous	$Sr(C_3H_5O_3)_2$	263.68
" Salicylate	$Sr(C_7H_5O_3)_2 + 2H_2O$	394.72
" Sulphate	$SrSO_4$	182.29
Strychnine	$C_{21}H_{22}N_2O_2$	331.73
" Nitrate	$C_{21}H_{22}N_2O_2HNO_3$	394.30
" Sulphate	$(C_{21}H_{22}N_2O_2)_2H_2SO_4 + 5H_2O$	850.21
" " Anhydrous	$(C_{21}H_{22}N_2O_2)_2H_2SO_4$	760.81
Sugar, Cane	$C_{12}H_{22}O_{11}$	339.60
" Grape (Glucose)	$C_6H_{12}O_6$	178.74
" Milk	$C_{12}H_{22}O_{11} + H_2O$	357.48
Sulphonethylmethane (Diethylsulphonemethylethylmethane)	$C_8H_{18}S_2O_4$	240.46
Sulphonmethane (Diethylsulphone-dimethylmethane)	$C_7H_{16}S_2O_4$	226.55
Sulphur	**S**	**31.83**
Sulphur Dioxide	SO_2	63.59

Tantalum	**Ta**	**181.6**
Tellurium	**Te**	**126.6**
Terbium	**Tb**	**158.8**
Terebene	$C_{10}H_{16}$	135.10
Terpin Hydrate	$C_{10}H_{20}O_2 + H_2O$	188.74
Tetramethylthionine Hydrochloride (See Methylthionine Hydrochloride)		
Tetraiodo-fluorescein (See Iodeosin)		
Tetraiodopyrrol (See Iodol)		
Thallium	**Tl**	**202.6**
Thiosinamine (Allyl-sulphocarbamide)	$(C_3H_5)CH_3N_2S$	115.33
Thorium	**Th**	**230.8**
Thulium	**Tu**	**169.7**
Thymol	$C_{10}H_{13}OH$	148.98
" Iodide (Dithymol-diiodide)	$C_{20}H_{24}O_2I_2$	545.76
Tin	**Sn**	**118.1**
Tin Salts (See under *Stannic* and *Stannous*)		
Titanium	**Ti**	**47.7**
Tungsten	**W**	**182.6**
Uranium	**U**	**236.7**
Vanadium	**V**	**50.8**
Vanillin	$C_8H_8O_3$	150.92
Water	H_2O	17.88
Xenon	**Xe**	**127.0**
Ytterbium	**Yb**	**171.7**
Yttrium	**Yt**	**88.3**
Zinc	**Zn**	**64.9**
Zinc Acetate	$Zn(C_2H_3O_2)_2 + 2H_2O$	217.82
" " Anhydrous	$Zn(C_2H_3O_2)_2$	182.06
" Bromide	$ZnBr_2$	223.62
" Carbonate (normal, not U. S. P.)	$ZnCO_3$	124.45
" Chloride	$ZnCl_2$	135.26
" Iodide	ZnI_2	316.70
" Oxide	ZnO	80.78
" Phenolsulphonate (Zinc Sulphocarbolate)	$Zn(C_6H_5O_4S)_2 + 8H_2O$	551.56
" Phosphide	Zn_3P_2	256.24
" Sulphate	$ZnSO_4 + 7H_2O$	285.41
" " Anhydrous	$ZnSO_4$	160.25
" Sulphide	ZnS	96.73
" Sulphocarbolate (See Zinc Paraphenolsulphonate)		
" Valerate (Valerianate)	$Zn(C_5H_9O_2)_2 + 2H_2O$	301.28
Zirconium	**Zr**	**89.9**

VII. Tables

Table of Atomic Weights

Adopted by the International Committee on Atomic Weights (1904)

H = 1.000

Name.	Symbol.	Atomic Weight.	Name.	Symbol.	Atomic Weight.
Aluminum	Al	26.9	Neodymium	Nd	142.5
Antimony	Sb	119.3	Neon	Ne	19.9
Argon	Ar	39.6	Nickel	Ni	58.3
Arsenic	As	74.4	Nitrogen	N	13.93
Barium	Ba	136.4	Osmium	Os	189.6
Bismuth	Bi	206.9	Oxygen	O	15.88
Boron	B	10.9	Palladium	Pd	105.7
Bromine	Br	79.36	Phosphorus	P	30.77
Cadmium	Cd	111.6	Platinum	Pt	193.3
Cæsium	Cs	131.9	Potassium	K	38.86
Calcium	Ca	39.8	Praseodymium‡	Pr	139.4
Carbon	C	11.91	Radium	Ra	223
Cerium	Ce	139.2	Rhodium	Rh	102.2
Chlorine	Cl	35.18	Rubidium	Rb	84.8
Chromium	Cr	51.7	Ruthenium	Ru	100.9
Cobalt	Co	58.56	Samarium	Sm	148.9
Columbium*	Cb	93.3	Scandium	Sc	43.8
Copper	Cu	63.1	Selenium	Se	78.6
Erbium	Er	164.8	Silicon	Si	28.2
Fluorine	F	18.9	Silver	Ag	107.12
Gadolinium	Gd	155	Sodium	Na	22.88
Gallium	Ga	69.5	Strontium	Sr	86.94
Germanium	Ge	71.9	Sulphur	S	31.83
Glucinum†	Gl	9.03	Tantalum	Ta	181.6
Gold	Au	195.7	Tellurium	Te	126.6
Helium	He	4	Terbium	Tb	158.8
Hydrogen	H	1.000	Thallium	Tl	202.6
Indium	In	113.1	Thorium	Th	230.8
Iodine	I	125.90	Thulium	Tu	169.7
Iridium	Ir	191.5	Tin	Sn	118.1
Iron	Fe	55.5	Titanium	Ti	47.7
Krypton	Kr	81.2	Tungsten	W	182.6
Lanthanum	La	137.9	Uranium	U	236.7
Lead	Pb	205.35	Vanadium	V	50.8
Lithium	Li	6.98	Xenon	Xe	127
Magnesium	Mg	24.18	Ytterbium	Yb	171.7
Manganese	Mn	54.6	Yttrium	Yt	88.3
Mercury	Hg	198.5	Zinc	Zn	64.9
Molybdenum	Mo	95.3	Zirconium	Zr	89.9

* Also called Niobium, Nb = 93.3. † Also called Beryllium, Be = 9.03.

‡ Also called Didymium, Di = 139.4.

Multiples of some Atomic and Molecular Weights

(H = 1)

H	1	2	3	4	5	6	7	8	9	H
O	15.88	31.76	47.64	63.52	79.40	95.28	111.16	127.04	142.92	O
OH	16.88	33.76	50.64	67.52	84.40	101.28	118.16	135.04	151.92	OH
H_2O	17.88	35.76	53.64	71.52	89.40	107.28	125.16	143.04	160.92	H_2O
N	13.93	27.86	41.79	55.72	69.65	83.58	97.51	111.44	125.37	N
NH_2	15.93	31.86	47.79	63.72	79.65	95.58	111.51	127.44	143.37	NH_2
NH_3	16.93	33.86	50.79	67.72	84.65	101.58	118.51	135.44	152.37	NH_3
NH_4	17.93	35.86	53.79	71.72	89.65	107.58	125.51	143.44	161.37	NH_4
NO	29.81	59.62	89.43	119.24	149.05	178.86	208.67	238.48	268.29	NO
NO_2	45.69	91.38	137.07	182.76	228.45	274.14	319.83	365.52	411.21	NO_2
NO_3	61.57	123.14	184.71	246.28	307.85	369.42	430.99	492.56	554.13	NO_3
C	11.91	23.82	35.73	47.64	59.55	71.46	83.37	95.28	107.19	C
CO	27.79	55.58	83.37	111.16	138.95	166.74	194.53	222.32	250.11	CO
CO_3	59.55	119.10	178.65	238.20	297.75	357.30	416.85	476.40	535.95	CO_3
CN	25.84	51.68	77.52	103.36	129.20	155.04	180.88	206.72	232.56	CN
Cl	35.18	70.36	105.54	140.72	175.90	211.08	246.26	281.44	316.62	Cl
Br	79.36	158.72	238.08	317.44	396.80	476.16	555.52	634.88	714.24	Br
I	125.90	251.80	377.70	503.60	629.50	755.40	881.30	1007.20	1133.10	I
S	31.83	63.66	95.49	127.32	159.15	190.98	222.81	254.64	286.47	S
SO_4	95.35	190.70	286.05	381.40	476.75	572.10	667.45	762.80	858.15	SO_4
PO_4	94.29	188.58	282.87	377.16	471.45	565.74	660.03	754.32	848.61	PO_4
Na	22.88	45.76	68.64	91.52	114.40	137.28	160.16	183.04	205.92	Na
K	38.86	77.72	116.58	155.44	194.30	233.16	272.02	310.88	349.74	K
H	1	2	3	4	5	6	7	8	9	H

Table of Thermometric Equivalents

Centigrade and Fahrenheit Scales

[illegible]

C.°	F.°	C.°	F.°	C.°	F.°	C.°	F.°
−40	−40						
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table of Thermometric Equivalents—*Continued*

C.°	F.°	C.°	F.°	C.°	F.°	C.°	F.°
15.5556	**60**	35.5556	**96**	55.5556	**132**	75.5556	**168**
16	60.8	**36**	96.8	**56**	132.8	**76**	168.8
16.1111	**61**	36.1111	**97**	56.1111	**133**	76.1111	**169**
16.6667	**62**	36.6667	**98**	56.6667	**134**	76.6667	**170**
17	62.6	**37**	98.6	**57**	134.6	**77**	170.6
17.2222	**63**	37.2222	**99**	57.2222	**135**	77.2222	**171**
17.7778	**64**	37.7778	**100**	57.7778	**136**	77.7778	**172**
18	64.4	**38**	100.4	**58**	136.4	**78**	172.4
18.3333	**65**	38.3333	**101**	58.3333	**137**	78.3333	**173**
18.8889	**66**	38.8889	**102**	58.8889	**138**	78.8889	**174**
19	66.2	**39**	102.2	**59**	138.2	**79**	174.2
19.4444	**67**	39.4444	**103**	59.4444	**139**	79.4444	**175**
20	**68**	**40**	**104**	**60**	**140**	**80**	**176**
20.5556	**69**	40.5556	**105**	60.5556	**141**	80.5556	**177**
21	69.8	**41**	105.8	**61**	141.8	**81**	177.8
21.1111	**70**	41.1111	**106**	61.1111	**142**	81.1111	**178**
21.6667	**71**	41.6667	**107**	61.6667	**143**	81.6667	**179**
22	71.6	**42**	107.6	**62**	143.6	**82**	179.6
22.2222	**72**	42.2222	**108**	62.2222	**144**	82.2222	**180**
22.7778	**73**	42.7778	**109**	62.7778	**145**	82.7778	**181**
23	73.4	**43**	109.4	**63**	145.4	**83**	181.4
23.3333	**74**	43.3333	**110**	63.3333	**146**	83.3333	**182**
23.8889	**75**	43.8889	**111**	63.8889	**147**	83.8889	**183**
24	75.2	**44**	111.2	**64**	147.2	**84**	183.2
24.4444	**76**	44.4444	**112**	64.4444	**148**	84.4444	**184**
25	**77**	**45**	**113**	**65**	**149**	**85**	**185**
25.5556	**78**	45.5556	**114**	65.5556	**150**	85.5556	**186**
26	78.8	**46**	114.8	**66**	150.8	**86**	186.8
26.1111	**79**	46.1111	**115**	66.1111	**151**	86.1111	**187**
26.6667	**80**	46.6667	**116**	66.6667	**152**	86.6667	**188**
27	80.6	**47**	116.6	**67**	152.6	**87**	188.6
27.2222	**81**	47.2222	**117**	67.2222	**153**	87.2222	**189**
27.7778	**82**	47.7778	**118**	67.7778	**154**	87.7778	**190**
28	82.4	**48**	118.4	**68**	154.4	**88**	190.4
28.3333	**83**	48.3333	**119**	68.3333	**155**	88.3333	**191**
28.8889	**84**	48.8889	**120**	68.8889	**156**	88.8889	**192**
29	84.2	**49**	120.2	**69**	156.2	**89**	192.2
29.4444	**85**	49.4444	**121**	69.4444	**157**	89.4444	**193**
30	**86**	**50**	**122**	**70**	**158**	**90**	**194**
30.5556	**87**	50.5556	**123**	70.5556	**159**	90.5556	**195**
31	87.8	**51**	123.8	**71**	159.8	**91**	195.8
31.1111	**88**	51.1111	**124**	71.1111	**160**	91.1111	**196**
31.6667	**89**	51.6667	**125**	71.6667	**161**	91.6667	**197**
32	89.6	**52**	125.6	**72**	161.6	**92**	197.6
32.2222	**90**	52.2222	**126**	72.2222	**162**	92.2222	**198**
32.7778	**91**	52.7778	**127**	72.7778	**163**	92.7778	**199**
33	91.4	**53**	127.4	**73**	163.4	**93**	199.4
33.3333	**92**	53.3333	**128**	73.3333	**164**	93.3333	**200**
33.8889	**93**	53.8889	**129**	73.8889	**165**	93.8889	**201**
34	93.2	**54**	129.2	**74**	165.2	**94**	201.2
34.4444	**94**	54.4444	**130**	74.4444	**166**	94.4444	**202**
35	**95**	**55**	**131**	**75**	**167**	**95**	**203**

Table of Thermometric Equivalents—*Continued*

C.°	F.°	C.°	F.°	C.°	F.°	C.°	F.°
95.5556	**204**	115.5556	**240**	135.5556	**276**	155.5556	**312**
96	204.8	**116**	240.8	**136**	276.8	**156**	312.8
96.1111	**205**	116.1111	**241**	136.1111	**277**	156.1111	**313**
96.6667	**206**	116.6667	**242**	136.6667	**278**	156.6667	**314**
97	206.6	**117**	242.6	**137**	278.6	**157**	314.6
97.2222	**207**	117.2222	**243**	137.2222	**279**	157.2222	**315**
97.7778	**208**	117.7778	**244**	137.7778	**280**	157.7778	**316**
98	208.4	**118**	244.4	**138**	280.4	**158**	316.4
98.3333	**209**	118.3333	**245**	138.3333	**281**	158.3333	**317**
98.8889	**210**	118.8889	**246**	138.8889	**282**	158.8889	**318**
99	210.2	**119**	246.2	**139**	282.2	**159**	318.2
99.4444	**211**	119.4444	**247**	139.4444	**283**	159.4444	**319**
100	**212**	**120**	**248**	**140**	**284**	**160**	**320**
100.5556	**213**	120.5556	**249**	140.5556	**285**	160.5556	**321**
101	213.8	**121**	249.8	**141**	285.8	**161**	321.8
101.1111	**214**	121.1111	**250**	141.1111	**286**	161.1111	**322**
101.6667	**215**	121.6667	**251**	141.6667	**287**	161.6667	**323**
102	215.6	**122**	251.6	**142**	287.6	**162**	323.6
102.2222	**216**	122.2222	**252**	142.2222	**288**	162.2222	**324**
102.7778	**217**	122.7778	**253**	142.7778	**289**	162.7778	**325**
103	217.4	**123**	253.4	**143**	289.4	**163**	325.4
103.3333	**218**	123.3333	**254**	143.3333	**290**	163.3333	**326**
103.8889	**219**	123.8889	**255**	143.8889	**291**	163.8889	**327**
104	219.2	**124**	255.2	**144**	291.2	**164**	327.2
104.4444	**220**	124.4444	**256**	144.4444	**292**	164.4444	**328**
105	**221**	**125**	**257**	**145**	**293**	**165**	**329**
105.5556	**222**	125.5556	**258**	145.5556	**294**	165.5556	**330**
106	222.8	**126**	258.8	**146**	294.8	**166**	330.8
106.1111	**223**	126.1111	**259**	146.1111	**295**	166.1111	**331**
106.6667	**224**	126.6667	**260**	146.6667	**296**	166.6667	**332**
107	224.6	**127**	260.6	**147**	296.6	**167**	332.6
107.2222	**225**	127.2222	**261**	147.2222	**297**	167.2222	**333**
107.7778	**226**	127.7778	**262**	147.7778	**298**	167.7778	**334**
108	226.4	**128**	262.4	**148**	298.4	**168**	334.4
108.3333	**227**	128.3333	**263**	148.3333	**299**	168.3333	**335**
108.8889	**228**	128.8889	**264**	148.8889	**300**	168.8889	**336**
109	228.2	**129**	264.2	**149**	300.2	**169**	336.2
109.4444	**229**	129.4444	**265**	149.4444	**301**	169.4444	**337**
110	**230**	**130**	**266**	**150**	**302**	**170**	**338**
110.5556	**231**	130.5556	**267**	150.5556	**303**	170.5556	**339**
111	231.8	**131**	267.8	**151**	303.8	**171**	339.8
111.1111	**232**	131.1111	**268**	151.1111	**304**	171.1111	**340**
111.6667	**233**	131.6667	**269**	151.6667	**305**	171.6667	**341**
112	233.6	**132**	269.6	**152**	305.6	**172**	341.6
112.2222	**234**	132.2222	**270**	152.2222	**306**	172.2222	**342**
112.7778	**235**	132.7778	**271**	152.7778	**307**	172.7778	**343**
113	235.4	**133**	271.4	**153**	307.4	**173**	343.4
113.3333	**236**	133.3333	**272**	153.3333	**308**	173.3333	**344**
113.8889	**237**	133.8889	**273**	153.8889	**309**	173.8889	**345**
114	237.2	**134**	273.2	**154**	309.2	**174**	345.2
114.4444	**238**	134.4444	**274**	154.4444	**310**	174.4444	**346**
115	**239**	**135**	**275**	**155**	**311**	**175**	**347**

Table of Thermometric Equivalents—*Continued*

C.°	F.°	C.°	F.°	C.°	F.°	C.°	F.°
175.5556	**348**	195.5556	**384**	215.5556	**420**	235.5556	**456**
176	348.8	**196**	384.8	**216**	420.8	**236**	456.8
176.1111	**349**	196.1111	**385**	216.1111	**421**	236.1111	**457**
176.6667	**350**	196.6667	**386**	216.6667	**422**	236.6667	**458**
177	350.6	**197**	386.6	**217**	422.6	**237**	458.6
177.2222	**351**	197.2222	**387**	217.2222	**423**	237.2222	**459**
177.7778	**352**	197.7778	**388**	217.7778	**424**	237.7778	**460**
178	352.4	**198**	388.4	**218**	424.4	**238**	460.4
178.3333	**353**	198.3333	**389**	218.3333	**425**	238.3333	**461**
178.8889	**354**	198.8889	**390**	218.8889	**426**	238.8889	**462**
179	354.2	**199**	390.2	**219**	426.2	**239**	462.2
179.4444	**355**	199.4444	**391**	219.4444	**427**	239.4444	**463**
180	**356**	**200**	**392**	**220**	**428**	**240**	**464**
180.5556	**357**	200.5556	**393**	220.5556	**429**	240.5556	**465**
181	357.8	**201**	393.8	**221**	429.8	**241**	465.8
181.1111	**358**	201.1111	**394**	221.1111	**430**	241.1111	**466**
181.6667	**359**	201.6667	**395**	221.6667	**431**	241.6667	**467**
182	359.6	**202**	395.6	**222**	431.6	**242**	467.6
182.2222	**360**	202.2222	**396**	222.2222	**432**	242.2222	**468**
182.7778	**361**	202.7778	**397**	222.7778	**433**	242.7778	**469**
183	361.4	**203**	397.4	**223**	433.4	**243**	469.4
183.3333	**362**	203.3333	**398**	223.3333	**434**	243.3333	**470**
183.8889	**363**	203.8889	**399**	223.8889	**435**	243.8889	**471**
184	363.2	**204**	399.2	**224**	435.2	**244**	471.2
184.4444	**364**	204.4444	**400**	224.4444	**436**	244.4444	**472**
185	**365**	**205**	**401**	**225**	**437**	**245**	**473**
185.5556	**366**	205.5556	**402**	225.5556	**438**	245.5556	**474**
186	366.8	**206**	402.8	**226**	438.8	**246**	474.8
186.1111	**367**	206.1111	**403**	226.1111	**439**	246.1111	**475**
186.6667	**368**	206.6667	**404**	226.6667	**440**	246.6667	**476**
187	368.6	**207**	404.6	**227**	440.6	**247**	476.6
187.2222	**369**	207.2222	**405**	227.2222	**441**	247.2222	**477**
187.7778	**370**	207.7778	**406**	227.7778	**442**	247.7778	**478**
188	370.4	**208**	406.4	**228**	442.4	**248**	478.4
188.3333	**371**	208.3333	**407**	228.3333	**443**	248.3333	**479**
188.8889	**372**	208.8889	**408**	228.8889	**444**	248.8889	**480**
189	372.2	**209**	408.2	**229**	444.2	**249**	480.2
189.4444	**373**	209.4444	**409**	229.4444	**445**	249.4444	**481**
190	**374**	**210**	**410**	**230**	**446**	**250**	**482**
190.5556	**375**	210.5556	**411**	230.5556	**447**	250.5556	**483**
191	375.8	**211**	411.8	**231**	447.8	**251**	483.8
191.1111	**376**	211.1111	**412**	231.1111	**448**	251.1111	**484**
191.6667	**377**	211.6667	**413**	231.6667	**449**	251.6667	**485**
192	377.6	**212**	413.6	**232**	449.6	**252**	485.6
192.2222	**378**	212.2222	**414**	232.2222	**450**	252.2222	**486**
192.7778	**379**	212.7778	**415**	232.7778	**451**	252.7778	**487**
193	379.4	**213**	415.4	**233**	451.4	**253**	487.4
193.3333	**380**	213.3333	**416**	233.3333	**452**	253.3333	**488**
193.8889	**381**	213.8889	**417**	233.8889	**453**	253.8889	**489**
194	381.2	**214**	417.2	**234**	453.2	**254**	489.2
194.4444	**382**	214.4444	**418**	234.4444	**454**	254.4444	**490**
195	**383**	**215**	**419**	**235**	**455**	**255**	**491**

Table of Thermometric Equivalents—*Continued*

C.°	F.°	C.°	F.°	C.°	F.°	C.°	F.°
255.5556	492	275.5556	528	295.5556	564	315.5556	600
256	492.8	276	528.8	296	564.8	316	600.8
256.1111	493	276.1111	529	296.1111	565	316.1111	601
256.6667	494	276.6667	530	296.6667	566	316.6667	602
257	494.6	277	530.6	297	566.6	317	602.6
257.2222	495	277.2222	531	297.2222	567	317.2222	603
257.7778	496	277.7778	532	297.7778	568	317.7778	604
258	496.4	278	532.4	298	568.4	318	604.4
258.3333	497	278.3333	533	298.3333	569	318.3333	605
258.8889	498	278.8889	534	298.8889	570	318.8889	606
259	498.2	279	534.2	299	570.2	319	606.2
259.4444	499	279.4444	535	299.4444	571	319.4444	607
260	500	280	536	300	572	320	608
260.5556	501	280.5556	537	300.5556	573	320.5556	609
261	501.8	281	537.8	301	573.8	321	609.8
261.1111	502	281.1111	538	301.1111	574	321.1111	610
261.6667	503	281.6667	539	301.6667	575	321.6667	611
262	503.6	282	539.6	302	575.6	322	611.6
262.2222	504	282.2222	540	302.2222	576	322.2222	612
262.7778	505	282.7778	541	302.7778	577	322.7778	613
263	505.4	283	541.4	303	577.4	323	613.4
263.3333	506	283.3333	542	303.3333	578	323.3333	614
263.8889	507	283.8889	543	303.8889	579	323.8889	615
264	507.2	284	543.2	304	579.2	324	615.2
264.4444	508	284.4444	544	304.4444	580	324.4444	616
265	509	285	545	305	581	325	617
265.5556	510	285.5556	546	305.5556	582	325.5556	618
266	510.8	286	546.8	306	582.8	326	618.8
266.1111	511	286.1111	547	306.1111	583	326.1111	619
266.6667	512	286.6667	548	306.6667	584	326.6667	620
267	512.6	287	548.6	307	584.6	327	620.6
267.2222	513	287.2222	549	307.2222	585	327.2222	621
267.7778	514	287.7778	550	307.7778	586	327.7778	622
268	514.4	288	550.4	308	586.4	328	622.4
268.3333	515	288.3333	551	308.3333	587	328.3333	623
268.8889	516	288.8889	552	308.8889	588	328.8889	624
269	516.2	289	552.2	309	588.2	329	624.2
269.4444	517	289.4444	553	309.4444	589	329.4444	625
270	518	290	554	310	590	330	626
270.5556	519	290.5556	555	310.5556	591	330.5556	627
271	519.8	291	555.8	311	591.8	331	627.8
271.1111	520	291.1111	556	311.1111	592	331.1111	628
271.6667	521	291.6667	557	311.6667	593	331.6667	629
272	521.6	292	557.6	312	593.6	332	629.6
272.2222	522	292.2222	558	312.2222	594	332.2222	630
272.7778	523	292.7778	559	312.7778	595	332.7778	631
273	523.4	293	559.4	313	595.4	333	631.4
273.3333	524	293.3333	560	313.3333	596	333.3333	632
273.8889	525	293.8889	561	313.8889	597	333.8889	633
274	525.2	294	561.2	314	597.2	334	633.2
274.4444	526	294.4444	562	314.4444	598	334.4444	634
[illegible]	527	295	563	315	599	335	635

List of Abbreviations Used in the Following Tables

abs. = absolute.
alc. = alcohol.
appt. = apparent.
cor. = correction.
dif. = difference.
frac. = fractional.
sp. gr. = specific gravity.
vol. = volume.
wt. = weight.

Alcohol Table

Percent. vol. abs. alc.*	Sp. gr. 15.6° C./15.6° C.†	Dif. of appt. sp. gr. for 1° C.‡	Frac. percent.§	Vol. in gal. of 100 lbs. av.‖	Cor. on foregoing for 0.1 percent.	No. of gal. official alc. in 100 lbs. av.‖	Cor. on foregoing for 0.1 percent.	Wt. in lbs. av. of 1 gal. U.S.¶	Percent. by wt. abs. alc.	Sp. gr. 15.6° C./15.6° C.	Cor. of sp. gr. for 1° C.‡
1	0.9985	0.00017	0.067	12.024	0.0018	0.127	0.0127	8.3164	1	0.9981	0.00017
2	0.9970	0.00018	0.071	12.043	0.0017	0.254	0.0127	8.3039	2	0.9963	0.00018
3	0.9956	0.00018	0.071	12.060	0.0017	0.381	0.0128	8.2922	3	0.9945	0.00019
4	0.9942	0.00019	0.071	12.077	0.0017	0.509	0.0128	8.2805	4	0.9928	0.00020
5	0.9928	0.00020	0.077	12.094	0.0016	0.637	0.0128	8.2689	5	0.9912	0.00021
6	0.9915	0.00021	0.077	12.109	0.0015	0.765	0.0129	8.2581	6	0.9896	0.00022
7	0.9902	0.00021	0.083	12.125	0.0015	0.894	0.0129	8.2472	7	0.9881	0.00023
8	0.9890	0.00022	0.083	12.140	0.0015	1.023	0.0129	8.2372	8	0.9867	0.00024
9	0.9878	0.00023	0.083	12.155	0.0015	1.152	0.0130	8.2272	9	0.9853	0.00025
10	0.9866	0.00024	0.091	12.170	0.0014	1.282	0.0130	8.2172	10	0.9839	0.00026
11	0.9855	0.00025	0.091	12.183	0.0013	1.412	0.0130	8.2081	11	0.9826	0.00027
12	0.9844	0.00025	0.091	12.197	0.0014	1.542	0.0130	8.1989	12	0.9813	0.00029
13	0.9833	0.00026	0.091	12.210	0.0013	1.672	0.0131	8.1898	13	0.9800	0.00030
14	0.9822	0.00027	0.091	12.224	0.0013	1.803	0.0131	8.1806	14	0.9788	0.00031
15	0.9811	0.00028	0.100	12.238	0.0013	1.934	0.0131	8.1714	15	0.9776	0.00033
16	0.9801	0.00029	0.100	12.250	0.0013	2.065	0.0131	8.1631	16	0.9764	0.00034
17	0.9791	0.00031	0.100	12.263	0.0013	2.196	0.0132	8.1548	17	0.9752	0.00036
18	0.9781	0.00032	0.100	12.275	0.0012	2.328	0.0132	8.1464	18	0.9740	0.00038
19	0.9771	0.00034	0.100	12.288	0.0013	2.460	0.0132	8.1381	19	0.9727	0.00040
20	0.9761	0.00035	0.100	12.300	0.0013	2.592	0.0132	8.1298	20	0.9715	0.00042

* Multiply these figures by 1.0535 for the volume percent. of official alcohol.

In the alcohol tables the words "abs. alc." (absolute alcohol) mean 100 percent. alcohol, not the official (99 percent.) absolute alcohol.

† Also approximately the weight in kilogrammes of one liter of the spirit.

‡ Add if the temperature is above, subtract if below, 15.6° C. (60° F.). If the temperature is taken in Fahrenheit degrees, multiply these figures by 0.555.

§ Corresponding with a difference in apparent specific gravity of 0.0001.

‖ For the volume in pints of 100 lbs. of the spirit, multiply these figures by 8; for the volume in fluidounces, multiply by 128; for the volume in liters, multiply by 3.7854.

For the volume of 100 ounces avoirdupois in gallons, divide the figures of the Table by 16; for the volume in pints, divide by 2; for the volume in fluidounces, multiply by 8.

For the volume of 100 grains in fluidounces, multiply by 0.01829; in minims, by 8.777.

¶ For the weight of one gallon in ounces avoirdupois, multiply these figures by 16; in grains, by 7000; in grammes, by 453.59.

For the weight of one pint in pounds, divide these figures by 8; for the weight of one pint in ounces, multiply by 2; in grains, multiply by 875.

For the weight of one fluidounce in ounces avoirdupois, divide these figures by 8; in grains, multiply by 54.69.

Alcohol Table—*Continued*

Per-cent. vol. abs. alc.	Sp. gr. 15.6° C./15.6° C.	Dif. of appt. sp. gr. for 1° C.	Frac. per-cent.	Vol. in gal. of 100 lbs. av.	Cor. on fore-going for 0.1 per-cent.	No. of gal. official alc. in 100 lbs. av.	Cor. on fore-going for 0.1 per-cent.	Wt. in lbs. av. of 1 gal. U.S.	Per-cent. by wt. abs. alc.	Sp. gr. 15.6° C./15.6° C.	Cor. of sp. gr. for 1° C.
21	0.9751	0.00037	0.100	12.313	0.0012	2.724	0.0133	8.1215	21	0.9703	0.00044
22	0.9741	0.00038	0.091	12.326	0.0013	2.857	0.0133	8.1131	22	0.9690	0.00046
23	0.9730	0.00040	0.100	12.340	0.0013	2.990	0.0133	8.1040	23	0.9677	0.00048
24	0.9720	0.00041	0.100	12.352	0.0014	3.123	0.0134	8.0956	24	0.9663	0.00049
25	0.9710	0.00043	0.091	12.365	0.0013	3.257	0.0134	8.0873	25	0.9649	0.00051
26	0.9699	0.00044	0.091	12.379	0.0014	3.391	0.0134	8.0782	26	0.9635	0.00053
27	0.9688	0.00046	0.091	12.393	0.0014	3.525	0.0135	8.0690	27	0.9621	0.00055
28	0.9677	0.00047	0.091	12.407	0.0015	3.660	0.0135	8.0598	28	0.9606	0.00057
29	0.9666	0.00049	0.083	12.421	0.0015	3.795	0.0136	8.0507	29	0.9590	0.00058
30	0.9654	0.00051	0.083	12.437	0.0015	3.931	0.0136	8.0407	30	0.9574	0.00060
31	0.9642	0.00052	0.083	12.452	0.0016	4.067	0.0136	8.0307	31	0.9558	0.00061
32	0.9630	0.00054	0.077	12.468	0.0017	4.203	0.0137	8.0207	32	0.9542	0.00063
33	0.9617	0.00055	0.077	12.485	0.0017	4.340	0.0138	8.0099	33	0.9524	0.00064
34	0.9604	0.00056	0.077	12.502	0.0017	4.478	0.0138	7.9990	34	0.9507	0.00065
35	0.9591	0.00058	0.071	12.518	0.0018	4.616	0.0139	7.9882	35	0.9489	0.00066
36	0.9577	0.00059	0.071	12.537	0.0018	4.755	0.0139	7.9765	36	0.9471	0.00067
37	0.9563	0.00060	0.071	12.555	0.0019	4.894	0.0140	7.9649	37	0.9452	0.00067
38	0.9549	0.00062	0.067	12.574	0.0020	5.034	0.0140	7.9532	38	0.9433	0.00068
39	0.9534	0.00063	0.067	12.593	0.0020	5.174	0.0141	7.9407	39	0.9414	0.00069
40	0.9519	0.00064	0.063	12.613	0.0021	5.315	0.0142	7.9282	40	0.9394	0.00070
41	0.9503	0.00065	0.063	12.634	0.0021	5.457	0.0143	7.9149	41	0.9374	0.00070
42	0.9487	0.00066	0.059	12.656	0.0022	5.600	0.0143	7.9016	**41.48**	0.9364	0.00071
43	0.9470	0.00067	0.059	12.678	0.0023	5.743	0.0144	7.8874	42	0.9353	0.00071
44	0.9453	0.00068	0.059	12.701	0.0023	5.888	0.0145	7.8733	43	0.9332	0.00072
45	0.9436	0.00069	0.059	12.724	0.0024	6.032	0.0146	7.8591	44	0.9311	0.00072
46	0.9419	0.00069	0.056	12.747	0.0024	6.178	0.0146	7.8449	45	0.9290	0.00073
47	0.9401	0.00070	0.053	12.771	0.0025	6.324	0.0147	7.8300	46	0.9269	0.00073
48	0.9382	0.00070	0.053	12.797	0.0026	6.471	0.0148	7.8141	47	0.9247	0.00074
48.95	0.9364	0.00071	0.053	12.822	0.0026	6.612	0.0148	7.7991	48	0.9225	0.00074
49	0.9363	0.00071	0.053	12.823	0.0026	6.620	0.0148	7.7983	49	0.9203	0.00075
50	0.9344	0.00071	0.053	12.849	0.0027	6.768	0.0150	7.7825	50	0.9181	0.00076
51	0.9324	0.00072	0.050	12.877	0.0028	6.919	0.0150	7.7658	51	0.9159	0.00076
52	0.9304	0.00073	0.050	12.905	0.0029	7.069	0.0152	7.7492	52	0.9137	0.00076
53	0.9284	0.00073	0.050	12.932	0.0028	7.221	0.0152	7.7325	53	0.9114	0.00077
54	0.9264	0.00074	0.047	12.960	0.0029	7.373	0.0154	7.7158	54	0.9092	0.00077
55	0.9243	0.00074	0.047	12.990	0.0030	7.527	0.0154	7.6984	55	0.9069	0.00077
56	0.9222	0.00075	0.045	13.019	0.0031	7.681	0.0156	7.6809	56	0.9047	0.00077
57	0.9200	0.00075	0.045	13.051	0.0031	7.837	0.0156	7.6625	57	0.9024	0.00078
58	0.9178	0.00075	0.045	13.082	0.0032	7.993	0.0158	7.6442	58	0.9002	0.00078
59	0.9156	0.00076	0.045	13.113	0.0032	8.151	0.0158	7.6259	59	0.8979	0.00078
60	0.9134	0.00076	0.045	13.145	0.0032	8.309	0.0160	7.6076	60	0.8956	0.00079
61	0.9111	0.00076	0.043	13.178	0.0033	8.469	0.0160	7.5884	61	0.8934	0.00079
62	0.9089	0.00077	0.043	13.210	0.0033	8.628	0.0162	7.5701	62	0.8910	0.00079
63	0.9066	0.00077	0.043	13.243	0.0033	8.790	0.0162	7.5509	63	0.8887	0.00080
64	0.9043	0.00077	0.043	13.277	0.0034	8.952	0.0163	7.5318	64	0.8863	0.00080
65	0.9020	0.00078	0.042	13.311	0.0035	9.115	0.0165	7.5126	65	0.8839	0.00080

Alcohol Table—*Continued*

Per-cent. vol. abs. alc.	Sp. gr. $\frac{15.6^\circ\text{ C.}}{15.6^\circ\text{ C.}}$	Dif. of appt. sp. gr. for 1° C.	Frac. per-cent.	Vol. in gal. of 100 lbs. av.	Cor. on fore-going for 0.1 per-cent.	No. of gal. official alc. in 100 lbs. av.	Cor. on fore-going for 0.1 per. cent.	Wt. in lbs. av. of 1 gal. U.S.	Per-cent. by wt. abs. alc.	Sp. gr. $\frac{15.6^\circ\text{ C.}}{15.6^\circ\text{ C.}}$	Cor. of sp. gr. for 1° C.
66	0.8996	0.00078	0.043	13.346	0.0035	9.280	0.0165	7.4926	66	0.8815	0.00080
67	0.8973	0.00078	0.042	13.381	0.0036	9.445	0.0166	7.4735	67	0.8791	0.00080
68	0.8949	0.00079	0.040	13.417	0.0036	9.611	0.0169	7.4535	68	0.8767	0.00081
69	0.8924	0.00079	0.042	13.454	0.0037	9.780	0.0169	7.4327	69	0.8743	0.00081
70	0.8900	0.00079	0.040	13.490	0.0038	9.948	0.0171	7.4127	70	0.8719	0.00081
71	0.8875	0.00079	0.038	13.528	0.0039	10.119	0.0173	7.3919	71	0.8696	0.00081
72	0.8849	0.00080	0.038	13.568	0.0040	10.292	0.0173	7.3702	72	0.8672	0.00081
73	0.8823	0.00080	0.038	13.608	0.0041	10.465	0.0175	7.3485	73	0.8648	0.00081
74	0.8797	0.00080	0.037	13.648	0.0042	10.640	0.0177	7.3269	74	0.8624	0.00081
75	0.8770	0.00081	0.038	13.690	0.0042	10.817	0.0177	7.3044	75	0.8600	0.00081
76	0.8744	0.00081	0.037	13.731	0.0042	10.994	0.0179	7.2827	76	0.8576	0.00081
77	0.8717	0.00081	0.037	13.774	0.0043	11.173	0.0180	7.2603	77	0.8552	0.00081
78	0.8690	0.00081	0.037	13.816	0.0043	11.353	0.0182	7.2378	78	0.8527	0.00080
79	0.8663	0.00081	0.037	13.859	0.0044	11.535	0.0183	7.2153	79	0.8503	0.00080
80	0.8636	0.00081	0.036	13.903	0.0045	11.718	0.0184	7.1928	80	0.8478	0.00080
81	0.8608	0.00081	0.036	13.948	0.0046	11.902	0.0187	7.1695	81	0.8454	0.00080
82	0.8580	0.00081	0.034	13.994	0.0046	12.089	0.0189	7.1462	82	0.8429	0.00080
83	0.8551	0.00080	0.034	14.041	0.0048	12.278	0.0190	7.1220	83	0.8404	0.00080
84	0.8522	0.00080	0.034	14.089	0.0049	12.468	0.0191	7.0978	84	0.8378	0.00080
85	0.8493	0.00080	0.033	14.137	0.0050	12.659	0.0195	7.0737	85	0.8353	0.00080
86	0.8463	0.00080	0.032	14.187	0.0052	12.854	0.0197	7.0487	86	0.8328	0.00080
87	0.8432	0.00080	0.031	14.239	0.0054	13.051	0.0200	7.0229	87	0.8302	0.00080
88	0.8400	0.00080	0.031	14.293	0.0054	13.251	0.0202	6.9962	88	0.8276	0.00080
89	0.8368	0.00080	0.031	14.348	0.0055	13.453	0.0203	6.9696	89	0.8250	0.00080
90	0.8336	0.00080	0.030	14.403	0.0057	13.656	0.0207	6.9429	90	0.8223	0.00080
91	0.8303	0.00080	0.029	14.460	0.0060	13.863	0.0210	6.9154	91	0.8196	0.00080
92	0.8269	0.00080	0.028	14.520	0.0063	14.073	0.0215	6.8871	92	0.8168	0.00080
93	0.8233	0.00080	0.027	14.583	0.0067	14.288	0.0219	6.8571	**92.3**	0.8160	0.00080
94	0.8196	0.00080	0.026	14.649	0.0069	14.507	0.0224	6.8263	93	0.8141	0.00080
94.92	0.8160	0.00080	0.026	14.714	0.0070	14.714	0.0224	6.7963	94	0.8113	0.00080
95	0.8157	0.00080	0.026	14.719	0.0070	14.731	0.0227	6.7938	95	0.8085	0.00080
96	0.8118	0.00080	0.024	14.790	0.0076	14.958	0.0234	6.7614	96	0.8056	0.00080
97	0.8076	0.00080	0.024	14.867	0.0080	15.192	0.0237	6.7264	97	0.8026	0.00080
98	0.8034	0.00080	0.021	14.945	0.0087	15.429	0.0249	6.6914	98	0.7997	0.00080
99	0.7987	0.00080	0.019	15.033	0.0099	15.678	0.0263	6.6523	99	0.7967	0.00080
100	0.7935	0.00080	....	15.131	......	15.941	......	6.6089	100	0.7935	0.00080

SPECIFIC GRAVITY OF ALCOHOL AT $\frac{25^\circ\text{ C.}}{25^\circ\text{ C.}}$*

Percent. volume absolute alcohol.†	Specific gravity.	Percent. weight absolute alcohol.	Specific gravity.	Percent. volume official alcohol.	Specific gravity.
1	0.9985	1	0.9981	1	0.9986
2	0.9970	2	0.9963	2	0.9971
3	0.9955	3	0.9944	3	0.9957
4	0.9940	4	0.9926	4	0.9943
5	0.9926	5	0.9909	5	0.9929

* Based upon the figures used in Dr. E. R. Squibb's table.

† These volume percentages are strictly accurate only at 15.6° C. the standard temperature for alcohol.

Specific Gravity of Alcohol at $\frac{25^\circ \text{C.}}{25^\circ \text{C.}}$—*Continued*

Percent. volume absolute alcohol.	Specific gravity.	Percent. weight absolute alcohol.	Specific gravity.	Percent. volume official alcohol.	Specific gravity.
6	0.9912	6	0.9892	6	0.9916
7	0.9898	7	0.9876	7	0.9903
8	0.9885	8	0.9861	8	0.9890
9	0.9872	9	0.9846	9	0.9878
10	0.9860	10	0.9831	10	0.9866
11	0.9848	11	0.9816	11	0.9854
12	0.9836	12	0.9802	12	0.9843
13	0.9825	13	0.9788	13	0.9832
14	0.9813	14	0.9774	14	0.9821
15	0.9801	15	0.9761	15	0.9810
16	0.9790	16	0.9747	16	0.9799
17	0.9778	17	0.9734	17	0.9788
18	0.9767	18	0.9720	18	0.9777
19	0.9756	19	0.9705	19	0.9767
20	0.9744	20	0.9691	20	0.9756
21	0.9733	21	0.9677	21	0.9745
22	0.9721	22	0.9663	22	0.9734
23	0.9709	23	0.9648	23	0.9723
24	0.9697	24	0.9633	24	0.9712
25	0.9685	25	0.9617	25	0.9700
26	0.9673	26	0.9601	26	0.9689
27	0.9660	27	0.9585	27	0.9677
28	0.9648	28	0.9568	28	0.9665
29	0.9635	29	0.9551	29	0.9653
30	0.9622	30	0.9533	30	0.9641
31	0.9608	31	0.9516	31	0.9629
32	0.9594	32	0.9498	32	0.9616
33	0.9580	33	0.9479	33	0.9603
34	0.9566	34	0.9461	34	0.9590
35	0.9552	35	0.9442	35	0.9576
36	0.9537	36	0.9423	36	0.9563
37	0.9521	37	0.9403	37	0.9550
38	0.9506	38	0.9383	38	0.9536
39	0.9490	39	0.9364	39	0.9521
40	0.9474	40	0.9344	40	0.9506
41	0.9457	41	0.9323	41	0.9491
42	0.9440	42	0.9301	42	0.9475
43	0.9422	43	0.9280	43	0.9459
44	0.9404	44	0.9258	44	0.9443
45	0.9386	45	0.9236	45	0.9426
46	0.9368	46	0.9214	46	0.9410
47	0.9350	47	0.9192	47	0.9393
48	0.9331	48	0.9170	48	0.9376
49	0.9311	49	0.9147	49	0.9359
50	0.9291	50	0.9124	50	0.9341
51	0.9271	51	0.9102	51	0.9323
52	0.9250	52	0.9079	52	0.9304
53	0.9230	53	0.9056	53	0.9285
54	0.9209	54	0.9034	54	0.9266
55	0.9187	55	0.9011	55	0.9246

Specific Gravity of Alcohol at $\frac{25^\circ\ \mathrm{C.}}{25^\circ\ \mathrm{C.}}$—*Continued*

Percent. volume absolute alcohol.	Specific gravity.	Percent. weight absolute alcohol.	Specific gravity.	Percent. volume official alcohol.	Specific gravity.
56	0.9165	56	0.8988	56	0.9227
57	0.9143	57	0.8965	57	0.9207
58	0.9121	58	0.8943	58	0.9186
59	0.9099	59	0.8920	59	0.9165
60	0.9077	60	0.8897	60	0.9144
61	0.9054	61	0.8874	61	0.9123
62	0.9031	62	0.8850	62	0.9102
63	0.9008	63	0.8826	63	0.9081
64	0.8984	64	0.8802	64	0.9060
65	0.8961	65	0.8778	65	0.9038
66	0.8937	66	0.8754	66	0.9016
67	0.8913	67	0.8730	67	0.8994
68	0.8889	68	0.8705	68	0.8972
69	0.8864	69	0.8681	69	0.8949
70	0.8840	70	0.8657	70	0.8926
71	0.8814	71	0.8634	71	0.8904
72	0.8788	72	0.8610	72	0.8881
73	0.8762	73	0.8586	73	0.8857
74	0.8736	74	0.8562	74	0.8834
75	0.8709	75	0.8538	75	0.8809
76	0.8682	76	0.8514	76	0.8784
77	0.8655	77	0.8490	77	0.8760
78	0.8628	78	0.8465	78	0.8735
79	0.8601	79	0.8441	79	0.8709
80	0.8574	80	0.8416	80	0.8684
81	0.8546	81	0.8392	81	0.8658
82	0.8518	82	0.8367	82	0.8632
83	0.8489	83	0.8342	83	0.8607
84	0.8460	84	0.8316	84	0.8581
85	0.8431	85	0.8291	85	0.8555
86	0.8401	86	0.8266	86	0.8528
87	0.8370	87	0.8240	87	0.8501
88	0.8338	88	0.8214	88	0.8474
89	0.8306	89	0.8188	89	0.8446
90	0.8274	90	0.8161	90	0.8418
91	0.8241	91	0.8134	91	0.8389
92	0.8207	92	0.8106	92	0.8359
93	0.8171	**92.3**	0.8098	93	0.8329
94	0.8134	93	0.8079	94	0.8299
94.9	0.8098	94	0.8051	95	0.8269
95	0.8095	95	0.8023	96	0.8237
96	0.8055	96	0.7994	97	0.8204
97	0.8014	97	0.7964	98	0.8170
98	0.7972	98	0.7935	99	0.8135
99	0.7925	99	0.7905	100	0.8098
100	0.7873	100	0.7873		

ACID AND ALKALI TABLES

Specific Gravity.—By specific gravity in the tables which follow is meant the weight (weighed in air with brass weights) of a volume of the fluid equal to the *unit* (1.0000) of pure water at the same temperature. Figures are given for the old standard temperature (15° C. = 59° F.), as well as for the new standard (25° C. = 77° F.). Corrections assume that glass apparatus is used.

Percentage.—To determine the strength of an acid or alkali by its specific gravity, take the apparent specific gravity at the room temperature by a pycnometer, hydrometer, or Mohr-Westphal balance. Correct to the standard temperature by the figures in column 4, and ascertain the percentage of the acid or alkali from columns 1 (or 2) and 5 in the following manner:

Example.—In a sample of phosphoric acid, the apparent specific gravity at 21° C. (room temperature), with the pycnometer standardized at 25° C., is 1.1110; the correction for 4° C. (subtractive) is 0.0003 × 4 = 0.0012 (from column 4). The corrected specific gravity, 1.1110 — 0.0012 = 1.1098. The nearest lower figure in column 2 is 1.1062, showing (column 1) 18 percent. of acid. For the fractional part, multiply the difference (1.1098 — 1.1062 = 0.0036, taken as 36) by 0.016 (column 5); the product is 0.576. The strength is therefore 18.576 percent.

Normality.—Column 6 shows the "normality,"—*i.e.*, the neutralizing power of the acid or alkali. If the figure in this column is 2.74, one volume of the acid, diluted with water to make 2.74 volumes, will be of "normal" strength. To determine the strength of an acid by titration with a normal alkali V.S., proceed as follows:

Example.—1 Cc.* (accurately measured) of a sample of acetic acid of unknown strength is found to require for neutralization 4.62 Cc. of normal potassium hydroxide V.S. The nearest lower figure in column 6 is 4.50, corresponding with 26 percent. For the fractional part, multiply the difference (4.62 — 4.50 = 0.12 taken as 12) by 0.056 (column 7). The product is 0.672. The strength is therefore 26.672 percent.

It is easy to prepare, by the aid of these figures, volumetric solutions of any desired strength ($\frac{N}{1}$, $\frac{N}{10}$, $\frac{N}{40}$, etc.) from any acid or alkali of known percentage strength. For accurate work such volumetric solutions should be standardized by the usual methods. (See Volumetric Solutions, page 544.)

The chief use, however, of the "normality" column is for the determination directly, by titration, of the percentage strength of an acid or alkali of unknown specific gravity. All that is necessary is to titrate one cubic centimeter of the fluid (accurately measured) with normal acid or alkali and proceed as explained above in exactly the same manner as in determining percentage by specific gravity, using the figures of columns 6 and 7 instead of those of 2 (or 3) and 5.

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* If the ordinary graduated apparatus, based on the Mohr liter, be used to measure the acid, the result will be a little higher (0.2 percent.) than the exact figure; in ordinary practice the correction may be neglected.

Specific Gravity of Alcohol at $\frac{25° C.}{25° C.}$—*Continued*

Percent. volume absolute alcohol.	Specific gravity.	Percent. weight absolute alcohol.	Specific gravity.	Percent. volume official alcohol.	Specific gravity.
56	0.9165	56	0.8988	56	0.9227
57	0.9143	57	0.8965	57	0.9207
58	0.9121	58	0.8943	58	0.9186
59	0.9099	59	0.8920	59	0.9165
60	0.9077	60	0.8897	60	0.9144
61	0.9054	61	0.8874	61	0.9123
62	0.9031	62	0.8850	62	0.9102
63	0.9008	63	0.8826	63	0.9081
64	0.8984	64	0.8802	64	0.9060
65	0.8961	65	0.8778	65	0.9038
66	0.8937	66	0.8754	66	0.9016
67	0.8913	67	0.8730	67	0.8994
68	0.8889	68	0.8705	68	0.8972
69	0.8864	69	0.8681	69	0.8949
70	0.8840	70	0.8657	70	0.8926
71	0.8814	71	0.8634	71	0.8904
72	0.8788	72	0.8610	72	0.8881
73	0.8762	73	0.8586	73	0.8857
74	0.8736	74	0.8562	74	0.8834
75	0.8709	75	0.8538	75	0.8809
76	0.8682	76	0.8514	76	0.8784
77	0.8655	77	0.8490	77	0.8760
78	0.8628	78	0.8465	78	0.8735
79	0.8601	79	0.8441	79	0.8709
80	0.8574	80	0.8416	80	0.8684
81	0.8546	81	0.8392	81	0.8658
82	0.8518	82	0.8367	82	0.8632
83	0.8489	83	0.8342	83	0.8607
84	0.8460	84	0.8316	84	0.8581
85	0.8431	85	0.8291	85	0.8555
86	0.8401	86	0.8266	86	0.8528
87	0.8370	87	0.8240	87	0.8501
88	0.8338	88	0.8214	88	0.8474
89	0.8306	89	0.8188	89	0.8446
90	0.8274	90	0.8161	90	0.8418
91	0.8241	91	0.8134	91	0.8389
92	0.8207	92	0.8106	92	0.8359
93	0.8171	92.3	0.8098	93	0.8329
94	0.8134	93	0.8079	94	0.8299
94.9	0.8098	94	0.8051	95	0.8269
95	0.8095	95	0.8023	96	0.8237
96	0.8055	96	0.7994	97	0.8204
97	0.8014	97	0.7964	98	0.8170
98	0.7972	98	0.7935	99	0.8135
99	0.7925	99	0.7905	100	0.8098
100	0.7873	100	0.7873		

Acetic Acid—*Continued*

Percent. absolute acetic acid.	Specific gravity. $\frac{25^\circ\text{ C.}}{25^\circ\text{ C.}}$	Specific gravity. $\frac{15^\circ\text{ C.}}{15^\circ\text{ C.}}$	Correction of specific gravity for 1° C.	Fractional percent.	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
41	1.0490	1.0541	0.00069	0.125	7.20	0.056
42	1.0498	1.0551	0.00070	0.111	7.38	0.056
43	1.0507	1.0560	0.00071	0.111	7.56	0.056
44	1.0516	1.0570	0.00072	0.125	7.74	0.053
45	1.0524	1.0579	0.00073	0.125	7.93	0.056
46	1.0532	1.0588	0.00074	0.125	8.11	0.056
47	1.0540	1.0597	0.00074	0.111	8.29	0.056
48	1.0549	1.0606	0.00075	0.125	8.47	0.053
49	1.0557	1.0615	0.00076	0.143	8.66	0.056
50	1.0564	1.0623	0.00077	0.125	8.84	0.056
51	1.0572	1.0631	0.00078	0.143	9.02	0.056
52	1.0579	1.0639	0.00078	0.143	9.20	0.053
53	1.0586	1.0646	0.00079	0.143	9.39	0.056
54	1.0593	1.0654	0.00080	0.167	9.57	0.053
55	1.0599	1.0661	0.00081	0.167	9.76	0.056
56	1.0605	1.0668	0.00081	0.167	9.94	0.056
57	1.0611	1.0674	0.00082	0.167	10.12	0.053
58	1.0617	1.0681	0.00083	0.167	10.31	0.056
59	1.0623	1.0687	0.00083	0.200	10.49	0.056
60	1.0628	1.0693	0.00084	0.200	10.67	0.053
61	1.0633	1.0699	0.00084	0.200	10.86	0.056
62	1.0638	1.0705	0.00085	0.200	11.04	0.056
63	1.0643	1.0710	0.00086	0.250	11.22	0.056
64	1.0647	1.0715	0.00087	0.250	11.40	0.053
65	1.0651	1.0720	0.00088	0.250	11.59	0.056
66	1.0655	1.0725	0.00088	0.250	11.77	0.056
67	1.0659	1.0729	0.00089	0.333	11.95	0.056
68	1.0662	1.0733	0.00090	0.250	12.13	0.053
69	1.0666	1.0737	0.00090	0.333	12.32	0.056
70	1.0669	1.0741	0.00091	0.333	12.50	0.056
71	1.0672	1.0745	0.00091	0.500	12.68	0.056
72	1.0674	1.0748	0.00092	0.500	12.86	0.056
73	1.0676	1.0750	0.00093	1.000	13.04	0.056
74	1.0677	1.0752	0.00093	1.000	13.22	0.056
75	1.0678	1.0754	0.00094	....	13.40	0.056
76	1.0679	1.0755	0.00095	....	13.58	0.056
77	1.0679	1.0756	0.00095	....	13.76	0.056
78	1.0679*	1.0756	0.00096	....	13.94	0.056
79	1.0678	1.0756	0.00096	....	14.12	0.056
80	1.0678	1.0756	0.00097	1.000	14.30	0.056

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* Below this point the specific gravity diminishes as the strength of the acid increases.

Acetic Acid—*Continued*

Percent. absolute acetic acid.	Specific gravity.		Correction of specific gravity for 1° C.	Fractional percent.	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
	$\frac{25^\circ \text{C.}}{25^\circ \text{C.}}$	$\frac{15^\circ \text{C.}}{15^\circ \text{C.}}$				
81	1.0677	1.0755	0.00097	0.500	14.48	0.056
82	1.0675	1.0754	0.00098	0.333	14.66	0.059
83	1.0672	1.0752	0.00099	0.333	14.83	0.059
84	1.0669	1.0750	0.00099	0.333	15.00	0.059
85	1.0666	1.0747	0.00100	0.250	15.17	0.059
86	1.0662	1.0744	0.00100	0.200	15.34	0.059
87	1.0657	1.0739	0.00101	0.200	15.51	0.059
88	1.0652	1.0734	0.00101	0.143	15.68	0.059
89	1.0645	1.0728	0.00102	0.143	15.85	0.059
90	1.0638	1.0721	0.00102	0.111	16.02	0.059
91	1.0629	1.0713	0.00103	0.111	16.19	0.063
92	1.0620	1.0704	0.00103	0.091	16.35	0.063
93	1.0609	1.0694	0.00104	0.077	16.51	0.063
94	1.0596	1.0682	0.00104	0.071	16.67	0.067
95	1.0582	1.0668	0.00105	0.059	16.82	0.067
96	1.0565	1.0652	0.00105	0.050	16.97	0.067
97	1.0545	1.0633	0.00106	0.045	17.12	0.071
98	1.0523	1.0612	0.00106	0.042	17.26	0.077
99	1.0499	1.0588	0.00107	0.037	17.39	0.077
100	**1.0472**	**1.0562**	**0.00108**	....	**17.52**	....

NOTE.—If the specific gravity $\left(\frac{25^\circ \text{C.}}{25^\circ \text{C.}}\right)$ of the acid be greater than 1.045, mix with some of the acid an equal weight of water before taking the specific gravity, and multiply the percentage taken from the table by two. It is better, however, to determine the strength of any sample of Acetic Acid by its "normality."

To find the weight in grammes of absolute Acetic Acid in 100 Cc., multiply the specific gravity by the percent. of absolute acid.

To find the volume percent. of official Acetic Acid, multiply the "normality" by 15.87. For the volume percent. of Glacial Acetic Acid, multiply the "normality" by 5.71. For the volume percent. of official Diluted Acetic Acid, multiply the "normality" by 99.

Hydrochloric Acid

Percent. hydrochloric acid.	Specific gravity.		Correction of specific gravity for 1° C.*	Fractional percent.†	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
	$\frac{25^\circ\ C.}{25^\circ\ C.}$	$\frac{15^\circ\ C.}{15^\circ\ C.}$				
1	1.0051	1.0051	0.00017	0.020	0.28	0.036
2	1.0101	1.0102	0.00018	0.020	0.56	0.036
3	1.0151	1.0152	0.00018	0.020	0.84	0.034
4	1.0201	1.0202	0.00019	0.020	1.13	0.036
5	1.0250	1.0253	0.00020	0.020	1.41	0.034
6	1.0299	1.0303	0.00021	0.020	1.70	0.033
7	1.0348	1.0353	0.00023	0.021	2.00	0.034
8	1.0396	1.0402	0.00024	0.021	2.29	0.033
9	1.0444	1.0452	0.00026	0.021	2.59	0.033
10	**1.0492**	**1.0502**	**0.00027**	**0.020**	**2.89**	**0.032**
11	1.0541	1.0552	0.00029	0.021	3.20	0.033
12	1.0589	1.0602	0.00031	0.020	3.50	0.032
13	1.0638	1.0652	0.00033	0.021	3.81	0.032
14	1.0686	1.0702	0.00035	0.021	4.12	0.031
15	1.0734	1.0752	0.00037	0.020	4.44	0.032
16	1.0783	1.0803	0.00039	0.020	4.75	0.031
17	1.0832	1.0853	0.00041	0.020	5.07	0.030
18	1.0881	1.0904	0.00043	0.021	5.40	0.031
19	1.0929	1.0954	0.00044	0.020	5.72	0.030
20	1.0978	1.1005	0.00046	0.020	6.05	0.030
21	1.1029	1.1058	0.00048	0.019	6.38	0.029
22	1.1081	1.1111	0.00050	0.020	6.72	0.029
23	1.1132	1.1164	0.00052	0.020	7.06	0.029
24	1.1183	1.1217	0.00054	0.020	7.40	0.029
25	1.1234	1.1270	0.00056	0.020	7.74	0.029
26	1.1284	1.1322	0.00058	0.020	8.09	0.029
27	1.1335	1.1375	0.00059	0.020	8.44	0.029
28	1.1386	1.1427	0.00061	0.020	8.79	0.029
29	1.1437	1.1480	0.00063	0.020	9.14	0.028
30	1.1487	1.1532	0.00065	0.020	9.50	0.028
31	1.1537	1.1583	0.00067	0.020	9.86	0.028
31.9	**1.1581**	**1.1629**	**0.00068**	**0.020**	**10.18**	**0.028**
32	1.1586	1.1634	0.00068	0.020	10.22	0.028
33	1.1636	1.1685	0.00070	0.020	10.58	0.027
34	1.1687	1.1737	0.00071	0.020	10.95	0.027
35	1.1736	1.1789	0.00073	0.020	11.32	0.027
36	1.1787	1.1842	0.00074	0.019	11.69	0.026
37	1.1839	1.1894	0.00076	0.019	12.07	0.026
38	1.1891	1.1947	0.00077	0.019	12.45	0.026
39	1.1943	1.2000	0.00078	0.019	12.83	0.026
40	1.1995	1.2053	0.00079	....	13.22	....

* Add if the temperature is above, subtract if below, 25° C.

† Corresponding with difference in specific gravity of 0.0001.

NOTE.—To find the percent. of chlorine, multiply the percent. of HCl by 0.9724.

To find the weight in grammes of HCl in 100 Cc., multiply the specific gravity by the percent. of HCl.

To find the volume percent. of official Hydrochloric Acid, multiply the "normality" by 9.823. For the volume percent. of official Diluted Hydrochloric Acid, multiply the "normality" by 34.60.

Nitric Acid

Percent. nitric acid.	Specific gravity.		Correction of specific gravity for 1° C.*	Fractional percent.†	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
	25° C./25° C.	15° C./15° C.				
1	1.0056	1.0057	0.00018	0.018	0.16	0.063
2	1.0112	1.0114	0.00020	0.019	0.32	0.059
3	1.0166	1.0170	0.00023	0.019	0.49	0.063
4	1.0219	1.0226	0.00025	0.019	0.65	0.059
5	1.0272	1.0282	0.00028	0.019	0.82	0.059
6	1.0325	1.0338	0.00030	0.019	0.99	0.059
7	1.0378	1.0394	0.00033	0.018	1.16	0.059
8	1.0433	1.0452	0.00036	0.018	1.33	0.059
9	1.0488	1.0510	0.00040	0.018	1.50	0.056
10	**1.0544**	**1.0569**	**0.00043**	**0.018**	**1.68**	**0.056**
11	1.0601	1.0629	0.00047	0.018	1.86	0.056
12	1.0658	1.0689	0.00050	0.017	2.04	0.056
13	1.0716	1.0751	0.00054	0.017	2.22	0.056
14	1.0776	1.0814	0.00058	0.017	2.40	0.053
15	1.0835	1.0877	0.00061	0.017	2.59	0.053
16	1.0895	1.0940	0.00065	0.016	2.78	0.053
17	1.0956	1.1004	0.00068	0.017	2.97	0.053
18	1.1016	1.1068	0.00072	0.016	3.16	0.053
19	1.1077	1.1132	0.00075	0.016	3.35	0.050
20	1.1138	1.1196	0.00078	0.016	3.55	0.050
21	1.1200	1.1261	0.00080	0.016	3.75	0.050
22	1.1263	1.1326	0.00083	0.016	3.95	0.050
23	1.1326	1.1391	0.00085	0.016	4.15	0.048
24	1.1390	1.1457	0.00087	0.016	4.36	0.050
25	1.1453	1.1522	0.00089	0.016	4.56	0.048
26	1.1517	1.1588	0.00090	0.015	4.77	0.048
27	1.1582	1.1654	0.00092	0.015	4.98	0.045
28	1.1647	1.1720	0.00094	0.015	5.20	0.048
29	1.1712	1.1787	0.00096	0.015	5.41	0.045
30	1.1778	1.1854	0.00097	0.015	5.63	0.045
31	1.1844	1.1921	0.00099	0.015	5.85	0.045
32	1.1910	1.1988	0.00100	0.015	6.07	0.043
33	1.1977	1.2057	0.00101	0.015	6.30	0.045
34	1.2044	1.2125	0.00102	0.015	6.52	0.043
35	1.2112	1.2194	0.00103	0.015	6.75	0.043
36	1.2178	1.2261	0.00104	0.015	6.98	0.042
37	1.2244	1.2328	0.00105	0.015	7.22	0.043
38	1.2310	1.2394	0.00106	0.015	7.45	0.042
39	1.2375	1.2460	0.00107	0.015	7.69	0.042
40	1.2440	1.2526	0.00108	0.016	7.93	0.042

* Add if the temperature is above, subtract if below, 25° C.

† Corresponding with a difference in specific gravity of 0.0001.

Nitric Acid—*Continued*

Percent. nitric acid.	Specific gravity.		Correction of specific gravity for 1° C.	Fractional percent.	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
	$\frac{25^\circ \text{C.}}{25^\circ \text{C.}}$	$\frac{15^\circ \text{C.}}{15^\circ \text{C.}}$				
41	1.2504	1.2591	0.00109	0.016	8.17	0.042
42	1.2569	1.2657	0.00110	0.015	8.41	0.040
43	1.2634	1.2722	0.00110	0.016	8.66	0.042
44	1.2698	1.2787	0.00111	0.015	8.90	0.040
45	1.2763	1.2853	0.00112	0.015	9.15	0.040
46	1.2828	1.2918	0.00113	0.016	9.40	0.040
47	1.2891	1.2982	0.00113	0.016	9.65	0.038
48	1.2954	1.3046	0.00114	0.016	9.91	0.040
49	1.3017	1.3110	0.00115	0.016	10.16	0.040
50	1.3079	1.3172	0.00116	0.017	10.42	0.038
51	1.3139	1.3233	0.00117	0.017	10.68	0.038
52	1.3199	1.3294	0.00118	0.017	10.94	0.038
53	1.3258	1.3353	0.00119	0.017	11.20	0.038
54	1.3316	1.3412	0.00120	0.018	11.46	0.038
55	1.3373	1.3470	0.00121	0.018	11.72	0.038
56	1.3429	1.3527	0.00122	0.018	11.98	0.037
57	1.3485	1.3584	0.00123	0.018	12.25	0.038
58	1.3540	1.3640	0.00124	0.019	12.51	0.037
59	1.3594	1.3695	0.00125	0.019	12.78	0.037
60	1.3648	1.3750	0.00126	0.020	13.05	0.038
61	1.3699	1.3802	0.00127	0.020	13.31	0.037
62	1.3750	1.3854	0.00128	0.020	13.58	0.037
63	1.3800	1.3905	0.00129	0.021	13.85	0.037
64	1.3848	1.3954	0.00130	0.022	14.12	0.037
65	1.3894	1.4002	0.00132	0.022	14.39	0.037
66	1.3939	1.4049	0.00132	0.023	14.66	0.037
67	1.3983	1.4094	0.00134	0.023	14.93	0.037
68	**1.4027**	**1.4139**	**0.00136**	**0.023**	**15.20**	**0.037**
69	1.4070	1.4183	0.00137	0.024	15.47	0.037
70	1.4112	1.4226	0.00139	0.025	15.74	0.037
71	1.4152	1.4268	0.00141	0.026	16.01	0.037
72	1.4191	1.4310	0.00144	0.026	16.28	0.037
73	1.4230	1.4351	0.00146	0.026	16.55	0.037
74	1.4268	1.4391	0.00148	0.027	16.82	0.037
75	1.4305	1.4430	0.00151	0.028	17.09	0.036
76	1.4341	1.4468	0.00153	0.027	17.37	0.037
77	1.4378	1.4506	0.00154	0.027	17.64	0.037
78	1.4415	1.4544	0.00156	0.028	17.91	0.036
79	1.4451	1.4582	0.00157	0.029	18.19	0.037
80	1.4486	1.4619	0.00159	0.029	18.46	0.036
81	1.4520	1.4654	0.00160	0.030	18.74	0.037
82	1.4553	1.4688	0.00161	0.030	19.01	0.036
83	1.4586	1.4721	0.00162	0.031	19.29	0.037
84	1.4618	1.4754	0.00163	0.032	19.56	0.036
85	1.4649	1.4786	0.00163	0.033	19.84	0.037

Nitric Acid—*Continued*

Percent. nitric acid.	Specific gravity.		Correction of specific gravity for 1° C.	Fractional percent.	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
	$\frac{25^\circ \text{C.}}{25^\circ \text{C.}}$	$\frac{15^\circ \text{C.}}{15^\circ \text{C.}}$				
86	1.4679	1.4817	0.00164	0.034	20.11	0.037
87	1.4707	1.4846	0.00165	0.036	20.38	0.036
88	1.4735	1.4875	0.00166	0.037	20.66	0.037
89	1.4762	1.4903	0.00167	0.040	20.93	0.037
90	1.4787	1.4929	0.00168	0.045	21.20	0.037
91	1.4809	1.4953	0.00169	0.045	21.47	0.038
92	1.4831	1.4976	0.00170	0.048	21.73	0.037
93	1.4852	1.4997	0.00172	0.056	22.00	0.037
94	1.4870	1.5017	0.00173	0.056	22.27	0.038
95	1.4888	1.5037	0.00175	0.050	22.53	0.037
96	1.4908	1.5059	0.00177	0.042	22.80	0.037
97	1.4932	1.5085	0.00179	0.037	23.07	0.036
98	1.4959	1.5115	0.00182	0.021	23.35	0.033
99	1.5007	1.5165	0.00184	0.012	23.67	0.027
100	1.5088	1.5249	0.00187	....	24.04	....

NOTE.—To find the percent. of N_2O_5, multiply the percent. of HNO_3 by 0.85712. To find the percent. of NO_3, multiply the percent. of HNO_3 by 0.98402.

To find the weight in grammes of HNO_3 in 100 Cc., multiply the specific gravity by the percent. of HNO_3.

To find the volume percent. of official Nitric Acid, multiply the "normality" by 6.579. For the volume percent. of official Diluted Nitric Acid, multiply the "normality" by 59.52.

Phosphoric Acid

Percent. phosphoric acid.	Specific gravity. $\frac{25° C.}{25° C.}$	Specific gravity. $\frac{15° C.}{15° C.}$	Correction of specific gravity for 1° C.*	Fractional percent.†	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
1	1.0056	1.0056	0.00017	0.018	0.21	0.048
2	1.0113	1.0113	0.00017	0.018	0.42	0.048
3	1.0169	1.0170	0.00018	0.018	0.63	0.048
4	1.0225	1.0226	0.00019	0.018	0.84	0.048
5	1.0281	1.0283	0.00020	0.018	1.05	0.045
6	1.0338	1.0340	0.00020	0.018	1.27	0.045
7	1.0395	1.0398	0.00021	0.017	1.49	0.045
8	1.0453	1.0457	0.00022	0.017	1.71	0.043
9	1.0512	1.0517	0.00022	0.017	1.94	0.043
10	**1.0572**	**1.0577**	**0.00023**	**0.017**	**2.17**	**0.043**
11	1.0632	1.0637	0.00024	0.017	2.40	0.043
12	1.0692	1.0698	0.00025	0.016	2.63	0.043
13	1.0753	1.0759	0.00025	0.016	2.86	0.042
14	1.0814	1.0821	0.00026	0.016	3.10	0.042
15	1.0875	1.0883	0.00027	0.016	3.34	0.042
16	1.0937	1.0945	0.00028	0.016	3.58	0.040
17	1.0999	1.1008	0.00029	0.016	3.83	0.040
18	1.1062	1.1072	0.00030	0.016	4.08	0.040
19	1.1125	1.1136	0.00031	0.016	4.33	0.038
20	1.1189	1.1201	0.00032	0.015	4.59	0.040
21	1.1254	1.1266	0.00033	0.015	4.84	0.038
22	1.1319	1.1332	0.00034	0.015	5.10	0.037
23	1.1385	1.1399	0.00034	0.015	5.37	0.038
24	1.1452	1.1467	0.00035	0.015	5.63	0.037
25	1.1519	1.1535	0.00036	0.014	5.90	0.037
26	1.1588	1.1604	0.00037	0.014	6.17	0.036
27	1.1657	1.1674	0.00037	0.014	6.45	0.036
28	1.1727	1.1745	0.00038	0.014	6.73	0.036
29	1.1799	1.1817	0.00039	0.014	7.01	0.034
30	1.1871	1.1889	0.00040	0.014	7.30	0.034
31	1.1943	1.1962	0.00040	0.014	7.59	0.034
32	1.2015	1.2035	0.00041	0.014	7.88	0.033
33	1.2088	1.2109	0.00042	0.014	8.18	0.033
34	1.2162	1.2184	0.00042	0.013	8.48	0.033
35	1.2237	1.2260	0.00043	0.013	8.78	0.033
36	1.2313	1.2336	0.00044	0.013	9.08	0.032
37	1.2389	1.2412	0.00044	0.013	9.39	0.031
38	1.2465	1.2489	0.00045	0.013	9.71	0.032
39	1.2542	1.2567	0.00046	0.013	10.02	0.032
40	1.2620	1.2645	0.00047	0.013	10.34	0.030
41	1.2698	1.2724	0.00047	0.013	10.67	0.030
42	1.2778	1.2804	0.00048	0.013	11.00	0.030
43	1.2858	1.2885	0.00049	0.012	11.33	0.029
44	1.2940	1.2967	0.00049	0.012	11.67	0.029
45	1.3023	1.3050	0.00050	0.012	12.01	0.029

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* Add if the temperature is above, subtract if below, 25° C.

† Corresponding with a difference in specific gravity of 0.0001.

Phosphoric Acid—*Continued*

Percent. phosphoric acid.	Specific gravity. $\frac{25° C.}{25° C.}$	Specific gravity. $\frac{15° C.}{15° C.}$	Correction of specific gravity for 1° C.	Fractional percent.	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
46	1.3106	1.3134	0.00051	0.012	12.35	0.029
47	1.3190	1.3219	0.00052	0.012	12.70	0.028
48	1.3276	1.3305	0.00052	0.012	13.06	0.028
49	1.3362	1.3392	0.00053	0.011	13.42	0.028
50	1.3449	1.3479	0.00054	0.011	13.78	0.027
51	1.3537	1.3568	0.00055	0.011	14.15	0.027
52	1.3626	1.3658	0.00055	0.011	14.52	0.026
53	1.3716	1.3748	0.00056	0.011	14.90	0.026
54	1.3807	1.3840	0.00057	0.011	15.28	0.026
55	1.3898	1.3932	0.00058	0.011	15.66	0.025
56	1.3991	1.4026	0.00058	0.011	16.06	0.026
57	1.4085	1.4120	0.00059	0.011	16.45	0.025
58	1.4180	1.4215	0.00060	0.010	16.85	0.024
59	1.4276	1.4312	0.00060	0.010	17.26	0.024
60	1.4373	1.4409	0.00061	0.010	17.67	0.024
61	1.4471	1.4508	0.00062	0.010	18.09	0.024
62	1.4570	1.4607	0.00063	0.010	18.51	0.023
63	1.4669	1.4706	0.00064	0.010	18.94	0.023
64	1.4768	1.4807	0.00065	0.010	19.37	0.023
65	1.4868	1.4908	0.00066	0.010	19.80	0.023
66	1.4970	1.5010	0.00067	0.010	20.24	0.022
67	1.5072	1.5113	0.00067	0.010	20.69	0.022
68	1.5175	1.5217	0.00068	0.010	21.14	0.022
69	1.5280	1.5322	0.00069	0.009	21.60	0.021
70	1.5386	1.5429	0.00070	0.009	22.07	0.021
71	1.5493	1.5536	0.00071	0.009	22.54	0.021
72	1.5600	1.5644	0.00072	0.009	23.01	0.021
73	1.5708	1.5753	0.00072	0.009	23.49	0.020
74	1.5817	1.5862	0.00073	0.009	23.98	0.020
75	1.5927	1.5972	0.00074	0.009	24.47	0.020
76	1.6038	1.6083	0.00073	0.009	24.97	0.020
77	1.6149	1.6193	0.00072	0.009	25.48	0.020
78	1.6261	1.6304	0.00072	0.009	25.99	0.020
79	1.6374	1.6416	0.00071	0.009	26.50	0.019
80	1.6488	1.6529	0.00070	0.009	27.02	0.019
81	1.6602	1.6642	0.00070	0.009	27.55	0.019
82	1.6717	1.6756	0.00069	0.009	28.09	0.019
83	1.6832	1.6871	0.00069	0.009	28.63	0.019
84	1.6948	1.6986	0.00068	0.009	29.17	0.018
85	**1.7065**	**1.7102**	**0.00068**	....	**29.72**	....

NOTE.—To find the percent. of P_2O_5, multiply the percent. of H_3PO_4 by 0.7243. To find the percent. of PO_4, multiply the percent. of H_3PO_4 by 0.96916.

To find the weight in grammes of H_3PO_4 in 100 Cc., multiply the specific gravity by the percent. of H_3PO_4.

To find the volume percent. of official Phosphoric Acid, multiply the "normality" by 3.365. For the volume percent. of official Diluted Phosphoric Acid, multiply the "normality" by 46.08.

Sulphuric Acid

Percent. sulphuric acid.	Specific gravity.		Correction of specific gravity for 1° C.*	Fractional percent.†	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
	25° C. / 25° C.	15° C. / 15° C.				
1	1.0067	1.0070	0.00021	0.015	0.21	0.048
2	1.0132	1.0137	0.00023	0.015	0.42	0.048
3	1.0197	1.0204	0.00025	0.015	0.63	0.048
4	1.0263	1.0272	0.00027	0.015	0.84	0.045
5	1.0329	1.0340	0.00029	0.015	1.06	0.045
6	1.0395	1.0408	0.00031	0.015	1.28	0.045
7	1.0462	1.0477	0.00034	0.015	1.50	0.043
8	1.0529	1.0547	0.00036	0.014	1.73	0.045
9	1.0598	1.0617	0.00038	0.014	1.95	0.042
10	**1.0667**	**1.0688**	**0.00040**	**0.014**	**2.19**	**0.043**
11	1.0737	1.0760	0.00042	0.014	2.42	0.042
12	1.0808	1.0832	0.00044	0.014	2.66	0.042
13	1.0879	1.0905	0.00046	0.014	2.90	0.042
14	1.0950	1.0978	0.00047	0.014	3.14	0.040
15	1.1023	1.1052	0.00049	0.014	3.39	0.040
16	1.1096	1.1127	0.00050	0.014	3.64	0.040
17	1.1170	1.1202	0.00052	0.014	3.89	0.038
18	1.1244	1.1277	0.00053	0.013	4.15	0.038
19	1.1319	1.1354	0.00054	0.013	4.41	0.038
20	1.1394	1.1430	0.00056	0.013	4.67	0.038
21	1.1471	1.1508	0.00057	0.013	4.93	0.037
22	1.1547	1.1586	0.00058	0.013	5.20	0.036
23	1.1625	1.1664	0.00060	0.013	5.48	0.037
24	1.1703	1.1743	0.00061	0.013	5.75	0.036
25	1.1781	1.1823	0.00062	0.013	6.03	0.034
26	1.1860	1.1903	0.00063	0.013	6.32	0.036
27	1.1939	1.1983	0.00065	0.013	6.60	0.033
28	1.2019	1.2064	0.00066	0.012	6.90	0.034
29	1.2100	1.2145	0.00066	0.012	7.19	0.034
30	1.2181	1.2226	0.00067	0.012	7.48	0.032
31	1.2262	1.2308	0.00068	0.012	7.79	0.033
32	1.2344	1.2391	0.00068	0.012	8.09	0.032
33	1.2427	1.2474	0.00069	0.012	8.40	0.032
34	1.2511	1.2558	0.00069	0.012	8.71	0.031
35	1.2594	1.2642	0.00070	0.012	9.03	0.031
36	1.2679	1.2727	0.00070	0.012	9.35	0.031
37	1.2764	1.2812	0.00071	0.012	9.67	0.030
38	1.2849	1.2898	0.00071	0.011	10.00	0.030
39	1.2936	1.2985	0.00071	0.011	10.33	0.029
40	1.3023	1.3072	0.00072	0.011	10.67	0.029

* Add if the temperature is above, subtract if below, 25° C.

† Corresponding with a difference in specific gravity of 0.0001.

Sulphuric Acid—*Continued*

Percent. sulphuric acid.	Specific gravity.		Correction of specific gravity for 1° C.	Fractional percent.	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
	$\frac{25^\circ\text{C.}}{25^\circ\text{C.}}$	$\frac{15^\circ\text{C.}}{15^\circ\text{C.}}$				
41	1.3111	1.3160	0.00072	0.011	11.01	0.029
42	1.3200	1.3249	0.00072	0.011	11.35	0.029
43	1.3289	1.3339	0.00072	0.011	11.70	0.028
44	1.3380	1.3429	0.00072	0.011	12.06	0.028
45	1.3471	1.3521	0.00073	0.011	12.42	0.028
46	1.3563	1.3613	0.00073	0.011	12.78	0.027
47	1.3657	1.3707	0.00074	0.011	13.15	0.027
48	1.3751	1.3802	0.00074	0.010	13.52	0.026
49	1.3847	1.3897	0.00075	0.010	13.90	0.026
50	1.3943	1.3994	0.00075	0.010	14.28	0.026
51	1.4041	1.4092	0.00076	0.010	14.67	0.026
52	1.4140	1.4191	0.00076	0.010	15.06	0.025
53	1.4239	1.4292	0.00077	0.010	15.46	0.025
54	1.4340	1.4393	0.00077	0.010	15.86	0.024
55	1.4442	1.4495	0.00078	0.010	16.27	0.024
56	1.4546	1.4599	0.00079	0.010	16.68	0.024
57	1.4650	1.4703	0.00079	0.010	17.10	0.023
58	1.4755	1.4809	0.00079	0.009	17.53	0.023
59	1.4862	1.4916	0.00080	0.009	17.96	0.023
60	1.4969	1.5025	0.00081	0.009	18.39	0.022
61	1.5078	1.5134	0.00082	0.009	18.84	0.023
62	1.5188	1.5244	0.00083	0.009	19.28	0.022
63	1.5299	1.5355	0.00083	0.009	19.74	0.022
64	1.5411	1.5467	0.00083	0.009	20.20	0.022
65	1.5523	1.5580	0.00084	0.009	20.66	0.021
66	1.5637	1.5694	0.00085	0.009	21.13	0.021
67	1.5751	1.5809	0.00085	0.009	21.61	0.021
68	1.5866	1.5924	0.00086	0.009	22.09	0.020
69	1.5981	1.6040	0.00087	0.009	22.58	0.020
70	1.6097	1.6156	0.00087	0.009	23.07	0.020
71	1.6214	1.6273	0.00088	0.009	23.57	0.020
72	1.6331	1.6391	0.00089	0.009	24.08	0.020
73	1.6448	1.6509	0.00090	0.009	24.59	0.020
74	1.6565	1.6627	0.00091	0.009	25.10	0.019
75	1.6682	1.6746	0.00092	0.008	25.62	0.019
76	1.6800	1.6864	0.00093	0.009	26.14	0.019
77	1.6916	1.6981	0.00094	0.009	26.67	0.019
78	1.7032	1.7097	0.00095	0.009	27.20	0.019
79	1.7146	1.7213	0.00096	0.009	27.73	0.019
80	1.7260	1.7328	0.00098	0.009	28.27	0.019
81	1.7370	1.7440	0.00100	0.009	28.81	0.019
82	1.7477	1.7548	0.00102	0.010	29.34	0.019
83	1.7579	1.7652	0.00103	0.010	29.88	0.019
84	1.7678	1.7752	0.00104	0.011	30.41	0.019
85	1.7771	1.7845	0.00105	0.011	30.93	0.019

Sulphuric Acid—*Continued*

Percent. sulphuric acid.	Specific gravity.		Correction of specific gravity for 1° C.	Fractional percent.	Normality. 1 Cc. requires normal KOH Cc.	Percent. = 0.01 Cc. normal KOH.
	25° C. / 25° C.	15° C. / 15° C.				
86	1.7858	1.7934	0.00108	0.013	31.45	0.020
87	1.7938	1.8013	0.00106	0.014	31.96	0.020
88	1.8012	1.8086	0.00105	0.015	32.46	0.020
89	1.8080	1.8153	0.00103	0.016	32.95	0.021
90	1.8141	1.8212	0.00102	0.019	33.43	0.021
91	1.8195	1.8265	0.00101	0.020	33.90	0.022
92	1.8243	1.8311	0.00099	0.024	34.36	0.022
92.5	**1.8263**	**1.8331**	**0.00099**	**0.026**	**34.59**	**0.022**
93	1.8284	1.8351	0.00098	0.029	34.82	0.023
94	1.8319	1.8384	0.00097	0.037	35.26	0.023
95	1.8346	1.8411	0.00097	0.050	35.69	0.024
96	1.8366	1.8430	0.00096	0.091	36.10	0.025
97	1.8377	1.8441	0.00096	....	36.50	0.027
97.5	*1.8379	1.8442	0.00095	....	36.69	0.028
98	1.8377	1.8441	0.00096	0.067	36.87	0.029
99	1.8364	1.8427	0.00095	0.029	37.22	0.032
100	1.8330	1.8394	0.00096	....	37.53	....

* Note that the specific gravity diminishes in acids of more than 97.5 percent. strength as the percentage increases.

Note.—To find the percent. of SO_3, multiply the percent. of H_2SO_4 by 0.81633; to find the percent. of SO_4, multiply the percent. of H_2SO_4 by 0.97946.

To find the weight in grammes of H_2SO_4 in 100 Cc., multiply the specific gravity by the percent. of H_2SO_4.

To find the volume percent. of official Sulphuric Acid, multiply the "normality" by 2.90. For the volume percent. of official Diluted Sulphuric Acid, multiply the "normality" by 45.76.

Ammonia

Percent. NH_3.	Specific gravity. $\frac{25° C.}{25° C.}$	$\frac{15° C.}{15° C.}$	Correction of specific gravity for 1° C.*	Fractional percent.†	Normality. 1 Cc. requires normal H_2SO_4 Cc.	Percent. = 0.01 Cc. normal H_2SO_4.
1	0.9955	0.9956	0.00019	0.023	0.58	0.017
2	0.9911	0.9913	0.00020	0.024	1.16	0.017
3	0.9869	0.9872	0.00021	0.024	1.74	0.018
4	0.9827	0.9832	0.00022	0.024	2.31	0.018
5	0.9786	0.9792	0.00023	0.024	2.88	0.018
6	0.9745	0.9752	0.00024	0.024	3.44	0.018
7	0.9704	0.9712	0.00025	0.024	4.00	0.018
8	0.9663	0.9673	0.00027	0.025	4.55	0.018
9	0.9623	0.9634	0.00028	0.026	5.10	0.018
10	**0.9585**	**0.9597**	**0.00029**	**0.026**	**5.65**	**0.019**
11	0.9547	0.9561	0.00031	0.027	6.19	0.019
12	0.9510	0.9526	0.00033	0.027	6.72	0.019
13	0.9473	0.9491	0.00034	0.027	7.25	0.019
14	0.9436	0.9456	0.00036	0.028	7.78	0.019
15	0.9400	0.9422	0.00038	0.028	8.31	0.019
16	0.9364	0.9387	0.00039	0.029	8.83	0.020
17	0.9329	0.9354	0.00040	0.029	9.34	0.019
18	0.9295	0.9321	0.00042	0.029	9.86	0.020
19	0.9261	0.9288	0.00043	0.030	10.37	0.020
20	0.9228	0.9256	0.00044	0.029	10.87	0.020
21	0.9194	0.9224	0.00046	0.030	11.37	0.020
22	0.9161	0.9192	0.00047	0.030	11.87	0.020
23	0.9128	0.9161	0.00049	0.031	12.37	0.020
24	0.9096	0.9131	0.00050	0.031	12.86	0.020
25	0.9064	0.9100	0.00052	0.031	13.35	0.020
26	0.9032	0.9070	0.00053	0.031	13.83	0.021
27	0.9000	0.9039	0.00055	0.032	14.31	0.021
28	**0.8969**	**0.9010**	**0.00056**	**0.032**	**14.79**	**0.021**
29	0.8938	0.8980	0.00058	0.032	15.27	0.021
30	0.8907	0.8951	0.00060	0.032	15.74	0.021
31	0.8876	0.8921	0.00061	0.034	16.21	0.021
32	0.8847	0.8893	0.00062	0.036	16.68	0.021
33	0.8819	0.8867	0.00063	0.038	17.15	0.022
34	0.8793	0.8842	0.00064	0.042	17.61	0.021
35	0.8769	0.8819	0.00065	....	18.08	....

* Add if the temperature is below, subtract if above, 25° C.

† Corresponding with a difference in specific gravity of 0.0001.

NOTE.—To find the percent. of NH_4, multiply the percent. of NH_3 by 1.0591.

To find the weight in grammes of NH_3 in 100 Cc., multiply the specific gravity by the percent. of NH_3.

To find the volume percent. of official Ammonia Water, multiply the "normality" by 17.699. For the volume percent. of official Stronger Ammonia Water, multiply the "normality" by 6.761.

Saturation Tables

I.—Table showing the Quantity of Official Alkalies required to saturate 100 Parts of an Official Acid, together with the Quantity of Product

ACIDS.		AMMONIUM.				POTASSIUM.					SODIUM.				
	Official Percent.	Ammon. Carbonate, 97 percent.	Ammonia Water, 10 percent.	Ammonia Water, 28 percent.	Product.	Potassium Hydroxide, 85 percent.	Solution of Potassium Hydroxide, 5 percent.	Potassium Bicarbonate, 99 percent.	Potassium Carbonate, 98 percent.	Product.	Sodium Hydroxide, 90 percent.	Solution of Sodium Hydroxide, 5 percent.	Sodium Bicarbonate, 99 percent.	Monohydrated Sodium Carbonate, 99.5 percent.	Product.
Acetic	36.0	32.39	102.30	36.53	**46.23**	39.62	673.60	60.67	42.32	**58.88**	26.69	480.48	50.92	37.40	**81.63**
" Diluted	6.0	5.40	17.05	6.09	**7.70**	6.60	112.27	10.11	7.05	**9.81**	4.45	80.08	8.49	6.23	**13.61**
" Glacial	99.0	89.08	281.31	100.47	**127.13**	108.96	1852.38	166.85	116.37	**161.91**	73.41	1321.33	140.03	102.86	**224.49**
Benzoic	100.0	44.26	139.77	49.92	**113.98**	54.14	920.33	82.90	57.82	**175.54**	36.47	656.48	69.57	51.11	**118.06**
Citric	99.5	76.75	242.38	86.56	**115.21**	93.88	1596.01	143.76	100.27	**153.70**	63.25	1138.45	120.65	88.63	**169.22**
Hydrobromic, Diluted	10.0	6.67	21.07	7.52	**12.11**	8.16	138.73	12.50	8.72	**14.71**	5.50	98.95	10.49	7.70	**12.72**
Hydrochloric	31.9	47.27	149.27	53.31	**46.83**	57.82	982.92	88.54	61.75	**65.28**	38.95	701.13	74.30	54.58	**51.19**
" Diluted	10.0	14.82	46.79	16.71	**14.68**	18.13	308.13	27.75	19.36	**20.46**	12.21	219.79	23.29	17.11	**16.05**
Lactic	75.0	44.99	142.08	50.74	**89.21**	55.03	935.55	84.27	58.77	**106.77**	37.07	667.34	70.72	51.95	**93.36**
Nitric	68.0	58.26	183.99	65.71	**86.40**	71.27	1211.55	109.13	76.11	**109.15**	48.01	864.21	91.58	67.28	**91.78**
" Diluted	10.0	8.57	27.06	9.66	**12.71**	10.48	178.17	16.05	11.19	**16.05**	7.06	127.09	13.47	9.89	**13.50**
Phosphoric	85.0	93.68	295.83	105.65	**114.58**	114.59	1947.95	175.46	122.38	**151.15**	77.19	1389.50	147.25	108.17	**310.69**
" Diluted	10.0	11.02	34.80	12.43	**13.48**	13.48	229.17	20.64	14.40	**17.78**	9.08	163.47	17.32	12.73	**36.55**
Salicylic	100.0	39.13	123.57	44.13	**112.36**	47.86	813.66	73.29	51.12	**127.63**	32.24	580.40	61.51	45.18	**115.97**
Sulphuric	92.5	101.88	321.73	114.90	**124.67**	124.62	2118.52	190.82	133.09	**164.45**	83.95	1511.17	160.15	117.64	**303.97**
" Diluted	10.0	11.01	34.78	12.42	**13.48**	13.47	229.03	20.63	14.39	**17.78**	9.08	163.37	17.31	12.72	**32.86**
Tartaric	99.5	71.64	226.23	80.80	**122.12**	87.63	1489.69	134.18	93.59	**156.07**	59.03	1062.62	112.61	82.72	**152.63**
Arsenic Trioxide	99.8	54.47	172.02	61.44	**126.09**	66.63	1132.73	102.03	71.16	**147.35**	44.89	807.99	85.63	62.90	**131.12**

II.—Table showing the Quantity of Official Acids required to saturate 100 parts of an Official Alkali. together with the Quantity of Product

ACIDS

ALKALIES.	Official Percent.	ACETIC.				BENZOIC.		CITRIC.		HYDROBROMIC.		HYDROCHLORIC.			LACTIC.	
		36 percent.	6 percent.	99 percent.	Product.	100 percent.	Product.	99.5 percent.	Product.	10 percent.	Product.	31.9 percent.	10 percent.	Product.	75 percent.	Product.
Ammonium Carbonate	97.0	308.70	1852.21	112.26	142.71	225.94	257.52	130.29	150.10	1498.93	181.47	211.55	674.85	99.06	222.26	198.28
Ammonia Water .	10.0	97.76	586.53	35.55	45.19	71.55	81.55	41.26	47.53	474.66	57.47	66.99	213.70	31.37	70.38	62.79
Ammonia Water, Stronger	28.0	273.72	1642.29	99.53	126.54	200.33	228.33	115.52	133.09	1329.05	160.90	187.58	598.37	87.84	197.08	175.81
Potassium Hydroxide	85.0	252.38	1514.26	91.77	148.59	184.72	324.25	106.52	163.72	1225.44	180.28	172.95	551.72	112.91	181.71	194.02
Solution of Potassium Hydroxide	5.0	14.85	89.07	5.40	8.74	10.87	19.07	6.27	9.63	72.08	10.60	10.17	32.45	6.64	10.69	11.41
Potassium Bicarbonate.........	99.0	164.82	988.90	59.93	97.04	120.63	211.75	69.56	106.92	800.29	117.73	112.95	360.31	73.73	118.67	126.71
Potassium Carbonate...........	99.0	236.31	1417.85	85.93	139.13	172.95	303.60	99.73	153.29	1147.41	168.80	161.94	516.59	105.72	170.14	181.66
Sodium Hydroxide............	90.0	374.62	2247.74	136.23	305.81	274.19	323.71	158.11	267.56	1819.01	231.43	256.73	818.96	131.42	269.73	251.82
Solution of Sodium Hydroxide	5.0	20.81	124.87	7.57	16.99	15.23	17.98	8.78	14.86	101.06	12.86	14.26	45.50	7.30	14.98	13.99
Sodium Bicarbonate...........	99.0	196.39	1178.32	71.41	160.31	143.74	169.70	82.89	140.26	953.57	121.31	134.58	429.32	68.90	141.40	132.01
Monohydrated Sodium Carbonate...........	99.5	267.35	1604.08	97.22	218.24	195.67	231.02	112.83	190.94	1298.13	165.16	183.21	584.45	93.79	192.49	179.71

inuation of Table showing the Quantity of Official Acids required to saturate 100 Parts of an Official Alkali, together with the Quantity of Product

ACIDS

ALKALIES.		NITRIC.			PHOSPHORIC.			SALICYLIC.		SULPHURIC.			TARTARIC.		ARSENIC TRIOXIDE.	
	Official Percent.	68 percent.	10 percent.	Product.	85 percent.	10 percent.	Product.	100 percent.	Product.	92.5 percent.	10 percent.	Product.	99.5 percent.	Product.	99.8 percent.	Product.
Ammonium Carbonate	97.0	171.63	1167.10	**148.29**	106.75	907.36	**122.32**	255.56	**287.14**	98.15	907.92	**122.37**	139.59	**170.47**	183.57	**231.46**
Ammonia Water..	10.0	54.35	369.58	**46.96**	33.80	287.33	**38.73**	80.93	**90.93**	31.08	287.51	**38.75**	44.20	**53.98**	58.13	**73.30**
Ammonia Water, Stronger	28.0	152.18	1034.83	**131.48**	94.65	804.52	**108.45**	226.60	**254.60**	87.03	805.02	**108.50**	123.77	**151.15**	162.77	**205.23**
Potassium Hydroxide........	85.0	140.32	954.15	**153.15**	87.27	741.81	**131.91**	208.93	**266.67**	80.24	742.26	**131.96**	114.12	**178.10**	150.08	**221.15**
Solution of Potassium Hydroxide	5.0	8.25	56.13	**9.01**	5.13	43.64	**7.76**	12.29	**15.69**	4.72	43.66	**7.76**	6.71	**10.48**	8.83	**13.01**
Potassium Bicarbonate	99.0	91.64	623.12	**100.02**	56.99	484.44	**86.15**	136.44	**174.15**	52.40	484.74	**86.18**	74.53	**116.31**	98.01	**144.42**
Potassium Carbonate	98.0	131.38	893.40	**143.40**	81.71	694.57	**123.52**	195.63	**249.69**	75.14	695.00	**123.56**	106.85	**166.76**	140.52	**207.07**
Sodium Hydroxide	90.0	208.28	1416.32	**191.16**	129.54	1101.12	**402.48**	310.13	**359.66**	119.11	1101.80	**362.07**	169.39	**258.55**	222.77	**292.09**
Solution of Sodium Hydroxide	5.0	11.57	78.68	**10.62**	7.20	61.17	**22.36**	17.23	**19.98**	6.62	61.21	**20.12**	9.41	**14.36**	12.38	**16.23**
Sodium Bicarbonate	99.0	109.19	742.47	**100.21**	67.91	577.23	**210.99**	162.58	**188.54**	62.44	577.59	**189.81**	88.80	**135.54**	116.78	**153.12**
Monohydrated Sodium Carbonate	99.5	148.64	1010.75	**136.42**	92.45	785.81	**287.22**	221.32	**256.67**	85.00	786.29	**258.39**	120.89	**184.51**	158.98	**208.45**

III. Table showing the Quantity of Official Alkalies and Acids required to make 100 Parts of the Corresponding Salts

AMMONIUM SALTS

AMMONIUM SALTS.	Parts of Alkali required.			Parts.	Parts of Acid required.	
	Ammonium Carbonate, 97 percent.	Ammonia Water, 10 percent.	Ammonia Water, 28 percent.			Official Percent.
Ammonium Acetate ..... $NH_4C_2H_3O_2$ = 76.51......	70.07	221.28	79.03	216.31 1297.87 78.66	Acetic Acid .... " " Diluted .... " " Glacial..........	36.0 6.0 99.0
" Arsenite .... NH_4AsO_2 = 124.09......	43.20	136.43	48.73	79.31	Arsenic Trioxide............	99.8
" Benzoate.... $NH_4C_7H_5O_2$ = 138.06......	38.83	122.63	43.80	87.74	Benzoic Acid	100.0
" Bromide .... NH_4Br = 97.29......	55.11	174.01	62.15	825.97	Hydrobromic Acid, Diluted..	10.0
" Chloride .... NH_4Cl = 53.11......	100.94	318.77	113.85	213.55 681.23	Hydrochloric Acid .... " " Diluted...	31.9 10.0
" Citrate...... $(NH_4)_3C_6H_5O_7$ = 241.41......	66.62	210.39	75.14	86.80	Citric Acid	99.5
" Lactate ..... $NH_4C_3H_5O_3$ = 106.30......	50.43	159.27	56.88	112.10	Lactic Acid	75.0
" Nitrate...... NH_4NO_3 = 79.50......	67.44	212.96	76.06	115.74 787.04	Nitric Acid .... " " Diluted..........	68.0 10.0
" Phosphate .. $(NH_4)_2HPO_4$ = 131.15......	81.76	258.18	92.21	87.27 741.82	Phosphoric Acid .... " " Diluted.....	85.0 10.0
" Salicylate ... $NH_4C_7H_5O_3$ = 153.94......	34.83	109.98	39.28	89.00	Salicylic Acid...............	100.0
" Sulphate .... $(NH_4)_2SO_4$ = 131.21......	81.72	258.06	92.16	80.21 741.95	Sulphuric Acid............. " " Diluted	92.5 10.0
" Tartrate..... $(NH_4)_2C_4H_4O_6$ = 182.78......	58.66	185.25	66.16	81.88	Tartaric Acid	99.5

Continuation of Table showing the Quantity of Official Alkalies and Acids required to make 100 Parts of the Corresponding Salts

POTASSIUM SALTS

POTASSIUM SALTS.		Parts of Alkali required.				Parts.	Parts of Acid required.	
		Potassium Hydroxide, 85 percent.	Solution of Potassium Hydroxide, 5 percent.	Potassium Bicarbonate, 99 percent.	Potassium Carbonate, 98 percent.			Official Percent.
Potassium Acetate ....$KC_2H_3O_2$	= 97.44...	67.30	1144.09	103.05	71.88	169.85	Acetic Acid	36.0
						1019.09	" " Diluted	6.0
						61.76	" " Glacial	99.0
" Arsenite ...$KAsO_2$	= 145.02...	45.22	768.72	69.24	48.29	67.86	Arsenic Trioxide	99.8
" Benzoate ...$KC_7H_5O_2 + 3H_2O$	= 212.63...	30.84	524.29	47.22	32.94	56.97	Benzoic Acid	100.0
" Bromide ...KBr	= 118.22...	55.47	943.00	84.94	59.22	679.76	Hydrobromic Acid, Diluted..	10.0
" Chloride ...KCl	= 74.04...	88.57	1505.67	135.62	94.59	153.18	Hydrochloric Acid	31.9
						488.66	" " Diluted...	10.0
" Citrate .....$K_3C_6H_5O_7 + H_2O$	= 322.08...	61.08	1038.37	93.53	65.23	65.06	Citric Acid	99.5
" Lactate.....$KC_3H_5O_3$	= 127.23...	51.54	876.21	78.92	55.05	93.66	Lactic Acid	75.0
" Nitrate .....KNO_3	= 100.43...	65.30	1110.03	99.98	69.74	91.62	Nitric Acid	68.0
						623.02	" " Diluted..........	10.0
" Phosphate..K_2HPO_4	= 173.01...	75.81	1288.71	116.08	80.96	66.16	Phosphoric Acid	85.0
						562.33	" " Diluted.....	10.0
" Salicylate ..$KC_7H_5O_3$	= 174.87...	37.50	637.50	57.42	40.05	78.35	Salicylic Acid	100.0
" Sulphate ...K_2SO_4	= 173.07...	75.78	1288.26	116.04	80.93	60.81	Sulphuric Acid..............	92.5
						562.49	" " Diluted	10.0
" Tartrate ....$2K_2C_4H_4O_6 + H_2O$	= 467.16...	56.15	954.53	85.98	59.97	64.08	Tartaric Acid	99.5

Continuation of Table showing the Quantity of Official Alkalies and Acids required to make 100 Parts of the Corresponding Salts

SODIUM SALTS

SODIUM SALTS.	Parts of Alkali required.				Parts.	Parts of Acid required.	
	Sodium Hydroxide, 90 percent.	Solution of Sodium Hydroxide, 5 percent.	Sodium Bicarbonate, 99 percent.	Monohydrated Sodium Carbonate, 99.5 percent.			Official Percent.
Sodium Acetate ....$NaC_2H_3O_2 + 3H_2O$ = 135.10...	32.70	588.60	62.38	45.82	122.50	Acetic Acid	36.0
					735.01	" " Diluted	6.0
					44.55	" " Glacial	99.0
" Arsenite ...$NaAsO_2$ = 129.04...	34.24	616.24	65.31	47.97	76.27	Arsenic Trioxide	99.8
" Benzoate ...$NaC_7H_5O_2$ = 143.01...	30.89	556.04	58.93	43.29	84.70	Benzoic Acid	100.0
" Bromide ...NaBr = 102.24...	43.21	777.78	82.43	60.55	786.00	Hydrobromic Acid, Diluted..	10.0
" Chloride ...NaCl = 58.06...	76.09	1369.62	145.15	106.62	195.34	Hydrochloric Acid	31.9
					623.15	" " Diluted...	10.0
" Citrate .....$2Na_3C_6H_5O_7 + 11H_2O$ = 709.20...	37.38	672.76	71.30	52.37	59.09	Citric Acid	99.5
" Lactate ....$NaC_3H_5O_3$ = 111.25...	39.71	714.78	75.75	55.65	107.11	Lactic Acid	75.0
" Nitrate.....$NaNO_3$ = 84.45...	52.31	941.62	99.79	73.30	108.96	Nitric Acid	68.0
					740.91	" " Diluted..........	10.0
" Phosphate..$Na_2HPO_4 + 12H_2O$ = 355.61...	24.84	447.23	47.40	34.81	32.19	Phosphoric Acid	85.0
					273.59	" " Diluted.....	10.0
" Salicylate ..$NaC_7H_5O_3$ = 158.89...	27.80	500.47	53.04	38.96	86.22	Salicylic Acid	100.0
" Sulphate ...$Na_2SO_4 + 10H_2O$ = 319.91...	27.62	497.14	52.68	38.70	32.90	Sulphuric Acid..............	92.5
					304.30	" " Diluted	10.0
" Tartrate....$Na_2C_4H_4O_6 + 2H_2O$ = 228.44...	38.67	696.20	73.78	54.20	65.52	Tartaric Acid	99.5

Equivalents of Weights and Measures

Metric, Avoirdupois, and Apothecaries

Note.—The values given for the relation of weight to measure are for Water at the temperature of 4° C. (39.2° F.) *in vacuo*. For ordinary, practical purposes, these values may be used, without correction.

Weights.						Metric Weight and Measure.	Measures.		
Grains.	Apothecaries		Avoirdupois				Fluid		Fluidounces and fractions.
	oz.	grains.	lbs.	oz.	grains.	Gm. or Cc.	ounces.	minims.	
15432.4	32	72.4	2	3	119.9	**1000**	33	390.6	33.814
15360.0	**32**	....	2	3	47.5	995.311	33	314.5	33.655
15060.9	31	180.9	2	2	185.9	975.932	**33**	....	**33**
15046.6	31	166.6	2	2	171.6	**975**	32	464.9	32.968
14880.0	**31**	....	2	2	5.0	964.208	32	289.7	32.604
14660.8	30	260.8	2	1	223.3	**950**	32	59.1	32.123
14604.5	30	204.5	2	1	167.0	946.358	**32**	....	**32**
14400.0	**30**	....	2	..	400.0	933.104	31	264.9	31.552
14275.0	29	355.0	2	..	275.0	**925**	31	133.3	31.278
14148.2	29	228.2	2	..	148.2	916.785	**31**	....	**31**
14000.0	29	80.0	**2**	..	....	907.185	30	324.2	30.675
13920.0	**29**	....	1	15	357.5	902.001	30	240.0	30.500
13889.2	28	449.2	1	15	326.7	**900**	30	207.6	30.432
13691.8	28	251.8	1	15	129.3	887.211	**30**	....	**30**
13562.5	28	122.5	**1**	**15**	....	878.835	29	344.1	29.717
13503.4	28	63.4	1	14	378.4	**875**	29	281.8	29.587
13440.0	**28**	....	1	14	315.0	870.897	29	215.2	29.448
13235.4	27	275.4	1	14	110.4	857.637	**29**	....	**29**
13125.0	27	165.0	**1**	**14**	....	850.486	28	363.9	28.758
13117.5	27	157.5	1	13	430.0	**850**	28	356.0	28.742
12960.0	**27**	....	1	13	272.5	839.794	28	190.4	28.397
12779.0	26	299.0	1	13	91.5	828.064	**28**	....	**28**
12731.7	26	251.7	1	13	44.2	**825**	27	430.3	27.896
12687.5	26	207.5	**1**	**13**	....	822.136	27	383.8	27.800
12480.0	**26**	....	1	12	230.0	808.690	27	165.6	27.345
12345.9	25	345.9	1	12	95.9	**800**	27	24.5	27.051
12322.6	25	322.6	1	12	72.6	798.490	**27**	....	**27**
12250.0	25	250.0	**1**	**12**	....	793.787	26	403.7	26.841
12000.0	**25**	....	1	11	187.5	777.587	26	140.7	26.293
11960.1	24	440.1	1	11	147.6	**775**	26	98.7	26.206
11866.2	24	346.2	1	11	53.7	768.916	**26**	....	**26**
11812.5	24	292.5	**1**	**11**	....	765.437	25	423.5	25.882
11574.3	24	54.3	1	10	199.3	**750**	25	173.0	25.360
11520.0	**24**	....	1	10	145.0	746.483	25	115.9	25.241
11409.8	23	369.8	1	10	34.8	739.343	**25**	....	**25**
11376.0	23	335.0	**1**	**10**	....	737.088	24	443.4	24.924
11188.5	23	148.5	1	9	251.0	**725**	24	247.2	24.515
11040.0	**23**	....	1	9	102.5	715.380	24	91.1	24.190
10953.4	22	393.4	1	9	15.9	709.769	**24**	....	**24**
10937.5	22	377.5	**1**	**9**	....	708.738	23	463.3	23.965

Equivalents of Weights and Measures—*Continued*

Weights.						Metric Weight and Measure.	Measures.		
Grains.	Apothecaries		Avoirdupois				Fluid		Fluidounces and fractions.
	oz.	grains.	lbs.	oz.	grains.	Gm. or Cc.	ounces.	minims.	
10802.6	22	242.6	1	8	302.6	**700**	23	321.4	23.670
10560.0	**22**	....	1	8	60.0	684.276	23	66.2	23.138
10500.0	21	420.0	**1**	**8**	....	680.389	23	3.1	23.007
10497.0	21	417.0	1	7	434.5	680.195	**23**	....	**23**
10416.9	21	336.9	1	7	354.4	**675**	22	395.7	22.824
10080.0	**21**	....	1	7	17.5	653.173	22	41.4	22.086
10062.5	20	462.5	**1**	**7**	....	652.039	22	23.0	22.048
10040.6	20	440.6	1	6	415.6	650.621	**22**	....	**22**
10031.1	20	431.1	1	6	406.1	**650**	21	469.9	21.979
9645.3	20	45.3	1	6	20.3	**625**	21	64.1	21.134
9625.0	20	25.0	**1**	**6**	....	623.690	21	42.9	21.089
9600.0	**20**	....	1	5	412.5	622.069	21	16.6	21.035
9584.2	19	464.2	1	5	396.7	621.048	**21**	....	**21**
9259.4	19	139.4	1	5	71.9	**600**	20	138.4	20.288
9187.5	19	67.5	**1**	**5**	....	595.340	20	62.7	20.131
9127.8	19	7.8	1	4	377.8	591.474	**20**	....	**20**
9120.0	**19**	....	1	4	370.0	590.966	19	471.8	19.983
8873.6	18	233.6	1	4	123.6	**575**	19	212.6	19.443
8750.0	18	110.0	**1**	**4**	....	566.991	19	82.6	19.172
8671.4	18	31.4	1	3	358.9	561.900	**19**	....	**19**
8640.0	**18**	....	1	3	327.5	559.862	18	446.9	18.931
8487.8	17	327.8	1	3	175.3	**550**	18	286.8	18.598
8312.5	17	152.5	**1**	**3**	....	538.641	18	102.5	18.214
8215.1	17	55.1	1	2	340.1	532.327	**18**	....	**18**
8160.0	**17**	....	1	2	285.0	528.759	17	422.1	17.879
8102.0	16	422.0	1	2	227.0	**525**	17	361.1	17.752
7875.0	16	195.0	**1**	**2**	....	510.291	17	122.4	17.255
7758.7	16	78.7	1	1	321.2	502.753	**17**	....	**17**
7716.2	16	36.2	1	1	278.7	**500**	16	435.3	16.907
7680.0	**16**	....	1	1	242.5	497.656	16	397.3	16.828
7437.5	15	237.5	**1**	**1**	....	481.942	16	142.2	16.296
7330.4	15	130.4	1	..	330.4	**475**	16	29.6	16.062
7302.3	15	102.3	1	..	302.3	473.179	**16**	....	**16**
7200.0	**15**	....	1	..	200.0	466.552	15	372.4	15.776
7000.0	14	280.0	**1**	..	....	453.592	15	162.1	15.338
6944.6	14	224.6	..	15	382.1	**450**	15	103.8	15.216
6845.9	14	125.9	..	15	283.4	443.606	**15**	....	**15**
6720.0	**14**	....	..	15	157.5	435.449	14	347.6	14.724
6562.5	13	322.5	..	**15**	....	425.243	14	182.0	14.379
6558.8	13	318.8	..	14	433.8	**425**	14	178.0	14.371
6389.5	13	149.5	..	14	264.5	414.032	**14**	....	**14**
6240.0	**13**	....	..	14	115.0	404.345	13	322.8	13.672

Equivalents of Weights and Measures—*Continued*

Weights.						Metric Weight and Measure.	Measures.		
Grains.	Apothecaries		Avoirdupois				Fluid		Fluidounces and fractions.
	oz.	grains.	lbs.	oz.	grains.	Gm. or Cc.	ounces.	minims.	
6173.0	12	413.0	..	14	48.0	**400**	13	252.3	13.526
6125.0	12	365.0	..	**14**	....	396.893	13	201.8	13.420
5933.1	12	173.1	..	13	245.6	384.458	**13**	....	**13**
5787.2	12	27.2	..	13	99.7	**375**	12	326.5	12.680
5760.0	**12**	....	..	13	72.5	373.242	12	298.0	12.621
5687.5	11	407.5	..	**13**	....	368.544	12	221.7	12.462
5476.7	11	196.7	..	12	226.7	354.884	**12**	....	**12**
5401.3	11	121.3	..	12	151.3	**350**	11	400.7	11.835
5280.0	**11**	....	..	12	30.0	342.138	11	273.1	11.569
5250.0	10	450.0	..	**12**	....	340.194	11	241.6	11.503
5020.3	10	220.3	..	11	207.8	325.311	**11**	....	**11**
5015.5	10	215.5	..	11	203.0	**325**	10	475.0	10.989
4812.5	10	12.5	..	**11**	....	311.845	10	261.4	10.545
4800.0	**10**	....	..	10	425.0	311.035	10	248.3	10.517
4629.7	9	309.7	..	10	254.7	**300**	10	69.2	10.144
4563.9	9	243.9	..	10	188.9	295.737	**10**	....	**10**
4375.0	9	55.0	..	**10**	....	283.495	9	281.3	9.586
4320.0	**9**	....	..	9	382.5	279.931	9	223.5	9.466
4244.0	8	404.0	..	9	306.5	**275**	9	143.4	9.299
4107.5	8	267.5	..	9	170.0	266.163	**9**	....	**9**
3937.5	8	97.5	..	**9**	....	255.146	8	301.2	8.627
3858.1	8	18.1	..	8	358.1	**250**	8	217.7	8.453
3840.0	**8**	....	..	8	340.0	248.828	8	198.6	8.414
3651.1	7	291.1	..	8	151.1	236.590	**8**	....	**8**
3500.0	7	140.0	..	**8**	....	226.796	7	321.0	7.669
3472.3	7	112.3	..	7	409.8	**225**	7	291.9	7.608
3360.0	**7**	....	..	7	297.5	217.724	7	173.8	7.362
3194.7	6	314.7	..	7	132.2	207.016	**7**	....	**7**
3086.5	6	206.5	..	7	24.0	**200**	6	366.1	6.763
3062.5	6	182.5	..	**7**	....	198.447	6	340.9	6.710
2880.0	**6**	....	..	6	255.0	186.621	6	149.0	6.310
2738.4	5	338.4	..	6	113.4	177.442	**6**	....	**6**
2700.7	5	300.7	..	6	75.7	**175**	5	440.4	5.917
2625.0	5	225.0	..	**6**	....	170.097	5	360.8	5.752
2400.0	**5**	....	..	5	212.5	155.517	5	124.1	5.259
2314.9	4	394.9	..	5	127.4	**150**	5	34.6	5.072
2282.0	4	362.0	..	5	94.5	147.869	**5**	....	**5**
2187.5	4	267.5	..	**5**	....	141.748	4	380.7	4.793
1929.1	4	9.1	..	4	179.1	**125**	4	108.8	4.227
1920.0	**4**	....	..	4	170.0	124.414	4	99.3	4.207
1825.6	3	385.6	..	4	75.6	118.295	**4**	....	**4**
1750.0	3	310.0	..	**4**	....	113.398	3	400.5	3.834

Equivalents of Weights and Measures—*Continued*

Weights.						Metric Weight and Measure.	Measures.		
Grains.	Apothecaries		Avoirdupois				Fluid		Fluidounces and fractions.
	oz.	grains.	lbs.	oz.	grains.	Gm. or Cc.	ounces.	minims.	
1543.2	3	103.2	..	3	230.7	**100**	3	183.1	3.382
1440.0	**3**	....	..	3	127.5	93.310	3	74.5	3.155
1388.9	2	428.9	..	3	76.4	**90**	3	20.8	3.043
1369.2	2	409.2	..	3	56.7	88.721	**3**	....	**3**
1312.5	2	352.5	..	**3**	....	85.049	2	420.4	2.876
1234.6	2	274.6	..	2	359.6	**80**	2	338.5	2.705
1157.4	2	197.4	..	2	282.4	**75**	2	257.3	2.536
1080.3	2	120.3	..	2	205.3	**70**	2	176.1	2.367
960.0	**2**	....	..	2	85.0	62.207	2	49.7	2.103
925.9	1	445.9	..	2	50.9	**60**	2	13.8	2.029
912.8	1	432.8	..	2	37.8	59.147	**2**	....	**2**
875.0	1	395.0	..	**2**	....	56.699	1	440.3	1.917
771.6	1	291.6	..	1	334.1	**50**	1	331.5	1.691
617.3	1	137.3	..	1	179.8	**40**	1	169.2	1.353
480.0	**1**	....	..	1	42.5	31.1035	1	24.8	1.052
463.0	..	....	..	1	25.5	**30**	1	6.9	1.014
456.392	..	....	..	1	18.89	29.5737	**1**	....	**1**
437.5	..	....	..	**1**	....	28.350	..	460.1308	0.959
385.8	..	....	..	..	....	**25**	..	405.77	0.845
308.6	..	....	..	..	....	**20**	..	324.61	0.676
154.3	..	....	..	..	....	**10**	..	162.31	0.338
15.4324	..	....	..	..	....	**1**	..	16.23	0.0338
1	..	....	..	..	....	0.06479	..	1.0517	0.0022
0.9508	..	....	..	..	....	0.06161	..	**1**	0.0021

Equivalents of Weights and Measures—*Continued*

From 480 Grains down

Grains.	Metric Weight and Measure. Gm. or Cc.	Minims (of Water at 4° C.).	Grains.	Metric Weight and Measure. Gm. or Cc.	Minims (of Water at 4° C.).
480 [1 ℥	31.103	504.8	**240** [4 ʒ	15.552	252.4
478.4	**31**	503.1	231.5	**15**	243.5
475.4	30.805	**500**	228.2	14.786	**240**
463.0	**30**	486.9	**218.75** [½ av. oz.	14.175	230.1
456.4	29.573	**480** [1 f℥	216.1	**14**	227.2
450	29.160	473.3	**210**	13.608	220.9
447.5	**29**	470.7	200.6	**13**	211.0
437.5 [1 av. oz.	28.350	460.1	199.7	12.938	**210**
432.1	**28**	454.5	185.2	**12**	194.8
427.9	27.725	**450**			
420 [7 ʒ	27.216	441.7	**180** [3 ʒ	11.664	189.3
416.7	**27**	438.2	171.1	11.090	**180**
401.2	**26**	422.0	169.8	**11**	178.5
399.3	25.876	**420**	154.3	**10**	162.3
390	25.272	410.2	**150**	9.720	157.8
385.8	**25**	405.8	142.6	9.242	**150**
380.3	24.644	**400**	138.9	**9**	146.1
370.8	24.028	**390**	123.5	**8**	129.8
370.4	**24**	389.5			
360 [6 ʒ	23.328	378.6	**120** [2 ʒ	7.776	126.2
354.9	**23**	373.3	114.1	7.393	**120**
342.3	22.180	**360**	**109.37** [¼ av. oz.	7.087	115.0
339.5	**22**	357.1	108.0	**7**	113.6
330	21.384	347.1	**100**	6.480	105.2
324.1	**21**	340.8	95.1	6.161	**100**
313.8	20.331	**330**	92.6	**6**	97.4
308.6	**20**	324.6	**80**	5.184	84.1
			77.2	**5**	81.2
			76.1	4.929	**80**
			61.7	**4**	64.9
300 (5 ʒ	19.440	315.5	**60** [1 ʒ	3.888	63.1
293.2	**19**	308.4	57.0	3.697	**60**
285.2	18.483	**300**	**54.69** [⅛ av. oz.	3.544	57.5
277.8	**18**	292.2	47.5	3.081	**50**
270	17.496	284.0	**50**	3.240	52.6
262.4	**17**	275.9	46.3	**3**	48.7
256.7	16.635	**270**	42.8	2.772	**45**
246.9	**16**	259.7	**40**	2.592	42.1
			38.0	2.464	**40**
			33.3	2.156	**35**
			30.9	**2**	32.5

Equivalents of Weights and Measures—*Continued*

From 30 Grains down.

Grains.	Metric Weight and Measure. Gm. or Cc.	Minims (of Water at 4° C.).
30 [½ ʒ	1.944	31.55
28.52	1.848	**30**
23.77	1.540	**25**
20	1.296	21.00
19.02	1.232	**20**
15.4324	**1**	16.23
15	0.972	15.78
14.26	0.924	**15**
14	0.907	14.72
13.31	0.863	**14**
13	0.842	13.67
12.36	0.801	**13**
12	0.778	12.62
11.41	0.739	**12**
11	0.713	11.57
10.46	0.678	**11**
10	0.648	10.52
9.51	0.616	**10**
9	0.583	9.47
8.56	0.554	**9**
8	0.518	8.41
7.71	**0.5**	8.12
7.61	0.493	**8**
7	0.454	7.36
6.66	0.431	**7**
6	0.389	6.31
5.70	0.370	**6**
5	0.324	5.26
4.75	0.308	**5**
4	0.259	4.21
3.80	0.246	**4**
3	0.194	3.16
2.85	0.185	**3**
2	0.130	2.10
1.90	0.123	**2**
1	0.06480	1.0517
0.9508	0.06161	**1**

Weights from 5 Grains down.

Grammes.	Grains in decimal fractions.	Grains in common fractions (approximate).
0.324	**5**	**5**
0.291	4.5	4½
0.259	**4**	**4**
0.227	3.5	3½
0.194	**3**	**3**
0.162	2.5	2½
0.130	**2**	**2**
0.097	1.5	1½
0.065	**1**	**1**
0.0609	0.94	15/16
0.0583	0.90	9/10
0.0570	0.88	7/8
0.0531	0.82	13/16
0.0518	0.80	4/5
0.0486	0.75	3/4
0.0447	0.69	11/16
0.0408	0.63	5/8
0.0363	0.56	9/16
0.0324	**0.5**	1/2
0.0285	0.44	7/16
0.0259	0.40	2/5
0.0246	0.38	3/8
0.0201	0.31	5/16
0.0162	0.25	1/4
0.0123	0.19	3/16
0.0084	0.13	1/8
0.0039	0.06	1/16
0.0032	0.05	1/20
0.0026	0.04	1/25
0.0022	0.033	1/30
0.0018	0.028	1/35
0.0016	0.025	1/40
0.0013	0.02	1/50
0.0011	0.017	1/60
0.0010	0.015	1/64
0.0006	0.01	1/100
0.0005	0.008	1/125
0.0004	0.0065	1/160
0.0003	0.005	1/200
0.0002	0.003	1/320
0.0001	0.0015	1/640

Equivalents of Measures of Length

Metric and Linear Measure

Centimeters.	Inches.	Centimeters.	Inches.	Millimeters.	Inches	
					in decimal fractions.	in 32ds.
150	59.06	**55**	21.65	25.4	1	$\frac{32}{32}$
145	57.09	53.3	**21**	**25**	0.98	..
140	55.12	50.8	**20**	24.0	0.94	..
139.7	**55**	**50**	19.69	23.8	0.94	$\frac{30}{32}$
135	53.15	48.3	**19**	23.0	0.91	$\frac{29}{32}$
130	51.18	45.7	**18**	22.2	0.87	$\frac{28}{32}$
127.0	**50**	**45**	17.72	22.0	0.87	..
125	49.21	43.2	**17**	21.0	0.83	..
120	47.24	40.6	**16**	20.6	0.81	$\frac{26}{32}$
115	45.28	**40**	15.75	**20**	0.79	..
114.3	**45**	38.1	**15**	19.1	0.75	$\frac{24}{32}$
110	43.31	35.6	**14**	19.0	0.75	..
105	41.34	**35**	13.78	18.0	0.71	..
101.6	**40**	33.0	**13**	17.5	0.69	$\frac{22}{32}$
100	39.37	30.5	**12**	17.0	0.67	..
99.1	**39**	**30**	11.81	16.0	0.63	..
96.5	**38**	27.9	**11**	15.9	0.62	$\frac{20}{32}$
95	37.40	25.4	**10**	**15**	0.59	..
94.0	**37**	**25**	9.84	14.3	0.56	$\frac{18}{32}$
91.4	**36**	22.9	**9**	14.0	0.55	..
90	35.43	20.3	**8**	13.0	0.51	..
88.9	**35**	**20**	7.87	12.7	0.50	$\frac{16}{32}$
86.4	**34**	17.8	**7**	12.0	0.47	..
85	33.46	15.2	**6**	11.1	0.44	$\frac{14}{32}$
83.8	**33**	**15**	5.91	11.0	0.43	..
81.3	**32**	12.7	**5**	**10**	0.39	..
80	31.50	10.2	**4**	9.5	0.38	$\frac{12}{32}$
78.7	**31**	**10**	3.94	**9**	0.35	..
76.2	**30**	**9**	3.54	8.7	0.34	$\frac{11}{32}$
75	29.53	**8**	3.15	**8**	0.31	..
73.7	**29**	7.6	**3**	7.9	0.31	$\frac{10}{32}$
71.1	**28**	**7**	2.76	7.1	0.28	$\frac{9}{32}$
70	27.56	**6**	2.36	**7**	0.28	..
68.6	**27**	5.1	**2**	6.4	0.25	$\frac{8}{32}$
66.0	**26**	**5**	1.97	**6**	0.24	..
65	25.59	**4**	1.57	5.6	0.22	$\frac{7}{32}$
63.5	**25**	**3**	1.18	**5**	0.20	..
61.0	**24**	2.54	**1**	4.8	0.19	$\frac{6}{32}$
60	23.62	**2**	0.78	**4**	0.16	..
58.4	**23**	**1**	0.39	3.2	0.13	$\frac{4}{32}$
55.9	**22**			**3**	0.12	..
				2.4	0.09	$\frac{3}{32}$
				2	0.08	..
				1.6	0.06	$\frac{2}{32}$
				1	0.04	..
				0.8	0.03	$\frac{1}{32}$
				0.1	0.0039	..

Table of Weight and Volume Relations

Specific gravity apparent 25° C./25° C.	Specific volume (volume of 1 kilogramme in liters).*	Weight of 1 U. S. gallon in pounds avoirdupois.†	Weight of 100 fluidounces in ounces avoirdupois.	Weight of 1 fluidounce in grains.	Volume in U. S. gallons of 100 pounds avoirdupois.‡	Volume in fluidounces of 100 ounces avoirdupois.	Volume in fluidounces of 1000 grains.
0.700	1.4286	5.819	72.74	318.2	17.185	137.48	3.143
0.710	1.4085	5.902	73.78	322.8	16.943	135.54	3.099
0.720	1.3889	5.985	74.82	327.3	16.707	133.66	3.056
0.730	1.3699	6.068	75.85	331.9	16.479	131.83	3.014
0.740	1.3514	6.151	76.89	336.4	16.256	130.05	2.973
0.750	1.3333	6.235	77.93	341.0	16.039	128.31	2.933
0.760	1.3158	6.318	78.97	345.5	15.828	126.62	2.894
0.770	1.2987	6.401	80.01	350.0	15.623	124.98	2.857
0.780	1.2821	6.484	81.05	354.6	15.422	123.38	2.820
0.790	1.2658	6.567	82.09	359.1	15.227	121.82	2.784
0.800	1.2500	6.650	83.13	363.7	15.037	120.30	2.750
0.810	1.2346	6.733	84.17	368.2	14.851	118.81	2.716
0.820	1.2195	6.817	85.21	372.8	14.670	117.36	2.683
0.830	1.2049	6.900	86.25	377.3	14.494	115.95	2.651
0.840	1.1905	6.983	87.28	381.9	14.321	114.57	2.619
0.850	1.1765	7.066	88.32	386.4	14.152	113.22	2.588
0.860	1.1628	7.149	89.36	391.0	13.988	111.90	2.558
0.870	1.1494	7.232	90.40	395.5	13.827	110.62	2.528
0.880	1.1364	7.315	91.44	400.1	13.670	109.36	2.500
0.890	1.1236	7.398	92.48	404.6	13.516	108.13	2.472
0.900	1.1111	7.481	93.52	409.1	13.366	106.93	2.444
0.910	1.0989	7.565	94.56	413.7	13.219	105.75	2.417
0.920	1.0870	7.648	95.60	418.2	13.075	104.60	2.391
0.930	1.0753	7.731	96.64	422.8	12.935	103.48	2.365
0.940	1.0638	7.814	97.68	427.3	12.797	102.38	2.340
0.950	1.0526	7.897	98.71	431.9	12.663	101.30	2.315
0.960	1.0417	7.980	99.75	436.4	12.531	100.25	2.291
0.970	1.0309	8.063	100.79	441.0	12.401	99.21	2.268
0.980	1.0204	8.147	101.83	445.5	12.275	98.20	2.245
0.990	1.0101	8.230	102.87	450.1	12.151	97.21	2.222
1.00	1.0000	8.313	103.91	454.6	12.029	96.23	2.200
1.02	0.9804	8.479	105.99	463.7	11.794	94.35	2.157
1.04	0.9615	8.645	108.07	472.8	11.567	92.54	2.115
1.06	0.9434	8.812	110.15	481.9	11.348	90.78	2.075
1.08	0.9259	8.978	112.22	491.0	11.138	89.10	2.037
1.10	0.9091	9.144	114.30	500.1	10.936	87.49	2.000
1.12	0.8929	9.310	116.38	509.2	10.741	85.93	1.964
1.14	0.8772	9.477	118.46	518.3	10.552	84.42	1.930
1.16	0.8621	9.643	120.54	527.4	10.370	82.96	1.897
1.18	0.8475	9.809	122.61	536.4	10.194	81.55	1.865

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* Or of one gramme in cubic centimeters; strictly true only at 0° C. in vacuo.

† Multiply these figures by 2 for weight of one U. S. pint in ounces avoirdupois.

‡ Divide these figures by 2 for volume in pints of 100 ounces avoirdupois.

Table of Weight and Volume Relations—*Continued*

Specific gravity apparent $\frac{25° C.}{25° C.}$	Specific volume (volume of 1 kilogramme in liters).	Weight of 1 U. S. gallon in pounds avoirdupois.	Weight of 100 fluidounces in ounces avoirdupois.	Weight of 1 fluidounce in grains.	Volume in U. S. gallons of 100 pounds avoirdupois.	Volume in fluidounces of 100 ounces avoirdupois.	Volume in fluidounces of 1000 grains.
1.20	0.8333	9.975	124.69	545.5	10.025	80.20	1.833
1.22	0.8197	10.142	126.77	554.6	9.860	78.88	1.803
1.24	0.8065	10.308	128.85	563.7	9.701	77.61	1.774
1.26	0.7937	10.474	130.93	572.8	9.547	76.38	1.746
1.28	0.7813	10.640	133.01	581.9	9.398	75.18	1.719
1.30	0.7692	10.807	135.08	591.0	9.253	74.02	1.692
1.32	0.7576	10.973	137.16	600.1	9.113	72.90	1.667
1.34	0.7463	11.139	139.24	609.2	8.977	71.82	1.642
1.36	0.7353	11.305	141.32	618.3	8.845	70.76	1.618
1.38	0.7246	11.472	143.40	627.4	8.717	69.74	1.594
1.40	0.7143	11.638	145.47	636.4	8.592	68.74	1.571
1.42	0.7042	11.804	147.55	645.5	8.471	67.77	1.549
1.44	0.6944	11.970	149.63	654.6	8.354	66.83	1.528
1.46	0.6849	12.137	151.71	663.7	8.239	65.91	1.507
1.48	0.6757	12.303	153.79	672.8	8.128	65.02	1.486
1.50	0.6667	12.469	155.87	681.9	8.020	64.16	1.466
1.52	0.6579	12.635	157.94	691.0	7.914	63.31	1.447
1.54	0.6494	12.802	160.02	700.1	7.811	62.49	1.428
1.56	0.6410	12.968	162.10	709.2	7.711	61.69	1.410
1.58	0.6329	13.134	164.18	718.3	7.614	60.91	1.392
1.60	0.6250	13.300	166.26	727.4	7.519	60.14	1.375
1.62	0.6173	13.467	168.33	736.5	7.426	59.41	1.358
1.64	0.6098	13.633	170.41	745.6	7.335	58.69	1.341
1.66	0.6025	13.799	172.49	754.6	7.247	57.98	1.325
1.68	0.5952	13.966	174.57	763.7	7.160	57.28	1.309
1.70	0.5882	14.132	176.65	772.8	7.076	56.61	1.294
1.72	0.5814	14.298	178.73	781.9	6.994	55.95	1.279
1.74	0.5747	14.464	180.80	791.0	6.913	55.31	1.264
1.76	0.5682	14.631	182.88	800.1	6.835	54.68	1.250
1.78	0.5618	14.797	184.96	809.2	6.758	54.06	1.236
1.80	0.5556	14.963	187.04	818.3	6.683	53.46	1.222
1.82	0.5495	15.129	189.12	827.4	6.610	52.88	1.209
1.84	0.5435	15.296	191.19	836.5	6.538	52.31	1.196
1.86	0.5376	15.462	193.27	845.6	6.467	51.74	1.183
1.88	0.5319	15.628	195.35	854.7	6.399	51.19	1.170
1.90	0.5263	15.794	197.43	863.8	6.331	50.65	1.158
1.92	0.5208	15.961	199.51	872.8	6.265	50.12	1.146
1.94	0.5155	16.127	201.59	881.9	6.201	49.61	1.134
1.96	0.5102	16.293	203.66	891.0	6.137	49.10	1.122
1.98	0.5051	16.459	205.74	900.1	6.075	48.60	1.111
2.00	0.5000	16.626	207.82	909.2	6.015	48.12	1.100

VIII. INDEX

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